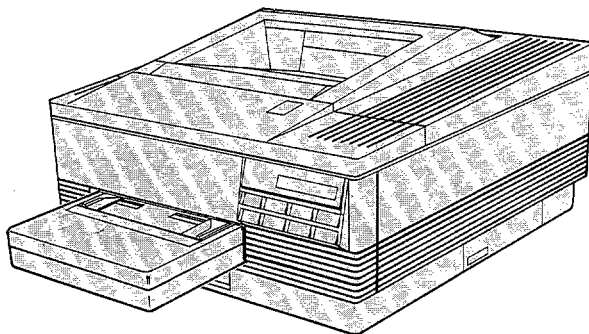


LaserJet Series II Printer (HP 33440) and LaserJet III Printer (HP 33449) Combined Service Manual



**HEWLETT
PACKARD**

**HP Part No. 33449 - 90906
Printed in USA**

First Edition - February 1990

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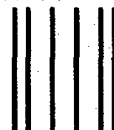
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Printing History

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First Edition – February 1990

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Conventions

This manual uses the following conventions:

Color indicates text or graphics that is specific to the LaserJet III (HP 33449) printer. Color may also be used for emphasis, titles, and other non-HP 33449-specific material.

The names of major printer parts and assemblies are capitalized.

Bold is used for emphasis, particularly in situations where *italic* type would be confusing.

Italic type is used to indicate related documents or for emphasis.

COMPUTER type indicates text visible on the printer's display or commands as seen on a PC terminal.

KEYFACE indicates keys, such as **MENU**, on the printer's Control Panel or on a computer keyboard.

Note

Notes contain important information set off from the text.



Caution

Caution messages appear before or after procedures which, if not observed, could result in loss of data or in damage to equipment.



Warning

Warning messages signal a specific procedure or practice which, if not followed correctly, could cause personal injury.



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1-1. INTRODUCTION

Features Common to Both Printers

Because the HP 33440 (LaserJet series II) and HP 33449 (LaserJet III) printers produce high-quality output quietly and reliably, they are ideally suited for today's business environment.

Both laser printers:

- Employ reliable, efficient, and easily maintained designs based on electrophotographic, electronic, and laser technologies to produce high-quality print on a variety of media, including copier papers, cotton bond papers, envelopes, transparencies, and labels. Output selection can be for either correct (face down) or reverse (face up) order.
- Combine a charging corona, photosensitive drum, toner, developer, and drum cleaner in a single assembly, the *Electrophotographic (EP-S) Cartridge*. Simply replacing the EP-S Cartridge allows maintenance and periodic replacement of consumables and parts by the customer, saving both time and maintenance costs.
- Employ a compact, safe semiconductor laser driven directly by control signals. It is certified as conforming to U.S. Bureau of Radiological Health (BRH) standards.
- Produce up to eight pages per minute, depending upon software and data constraints, with extended symbol set capability and Control Panel configurability.
- Provide serial (RS-232 and RS-422) and parallel (Centronics) I/O capabilities, with provision for other I/O capabilities through an optional I/O slot.
- Support macro cartridges for forms generation.

Features Which Apply Only to the HP 33440

- **Memory:** Provides 512 Kbytes total internal read/write memory with the capability to increase memory by the addition of 1, 2, or 4 Mbytes, through a single expansion slot, up to 4.5 Mbytes total.
- **Font Handling:** Provides up to 7-inch character cell size, printable space character, downloadable fonts, font management, and up to 16 fonts per page. Ten bitmapped fixed-pitch internal fonts are standard. Two font cartridge slots are available.
- **Printer Command Language:** Employs the PCL4™ Printer Command Language.
- **PostScript® Printer Language:** Supports the PostScript® printer language through an optional HP interface package.
- **Resolution:** Provides up to 300 x 300 DPI (dots per inch) resolution.

Features Which Apply Only to the HP 33449

- **Memory:** Provides 1 Mbyte of total internal read/write memory with the capability to increase memory by the addition of 1, 2, 3, or 4 Mbytes, through two expansion slots, up to a total of 5 Mbytes.
- **Font Handling:** Provides all the features of the HP 33440 as well as font scaling capability for generating fonts of any desired size from 4 to 999.75 points in quarter-point increments and autorotation for fonts and raster graphics. (Print images are rotated automatically as the page orientation is rotated, allowing available fonts to be used in all rotations.) Expanded symbol sets are also built in, as well as 14 bitmapped fonts and eight scalable typefaces.
- **Printer Command Language:** Employs the PCL5TM Printer Command Language, containing HP-GL/2 (HP's standard plotter language) and other enhanced printing features such as font scaling and font rotation.
- **PostScript^R Printer Language:** Supports PostScript^R printer language through an optional HP personality cartridge.
- **Resolution:** Provides up to 300 x 300 DPI resolution as well as employing *Resolution Enhancement*,TM an HP proprietary technology that improves the visual quality of printed images beyond the 300 DPI standard capability.
- **Page Protection:** Provides, with expanded memory, the ability to avoid partial printing of complex, graphics-intensive pages.
- **Localized Display Messages:** Allows localization of display messages for five languages.

1-2. IDENTIFICATION

The regulatory labels, located behind the Face-Up (Rear) Output Tray, are different for the HP 33440 and HP 33449. For the HP 33440, the regulatory label contains both the model and serial number. On the HP 33449, the model and serial number are located on a separate label just below the power connector on the right side panel of the Main Body Covers (see Figure 1-1). Note that this portion of the right side panel is removable on the HP 33449. (Care must be taken to ensure the printer's cover, with its serial number, stays with the printer.) The model number is an alphanumeric such as HP 33440A or 33449AB.

For both printers, the serial number consists of the following sequence: a four digit prefix, a letter, and a five digit suffix (for example: 0000J00000). The prefix is used to indicate year and week of manufacture. The letter designates the country in which the printer was manufactured ("J" indicates Japan, for example). The suffix is a sequential number incremented for each printer produced.

For both printers, the power rating is located on a plate next to the Power Switch (see Figure 1-1).

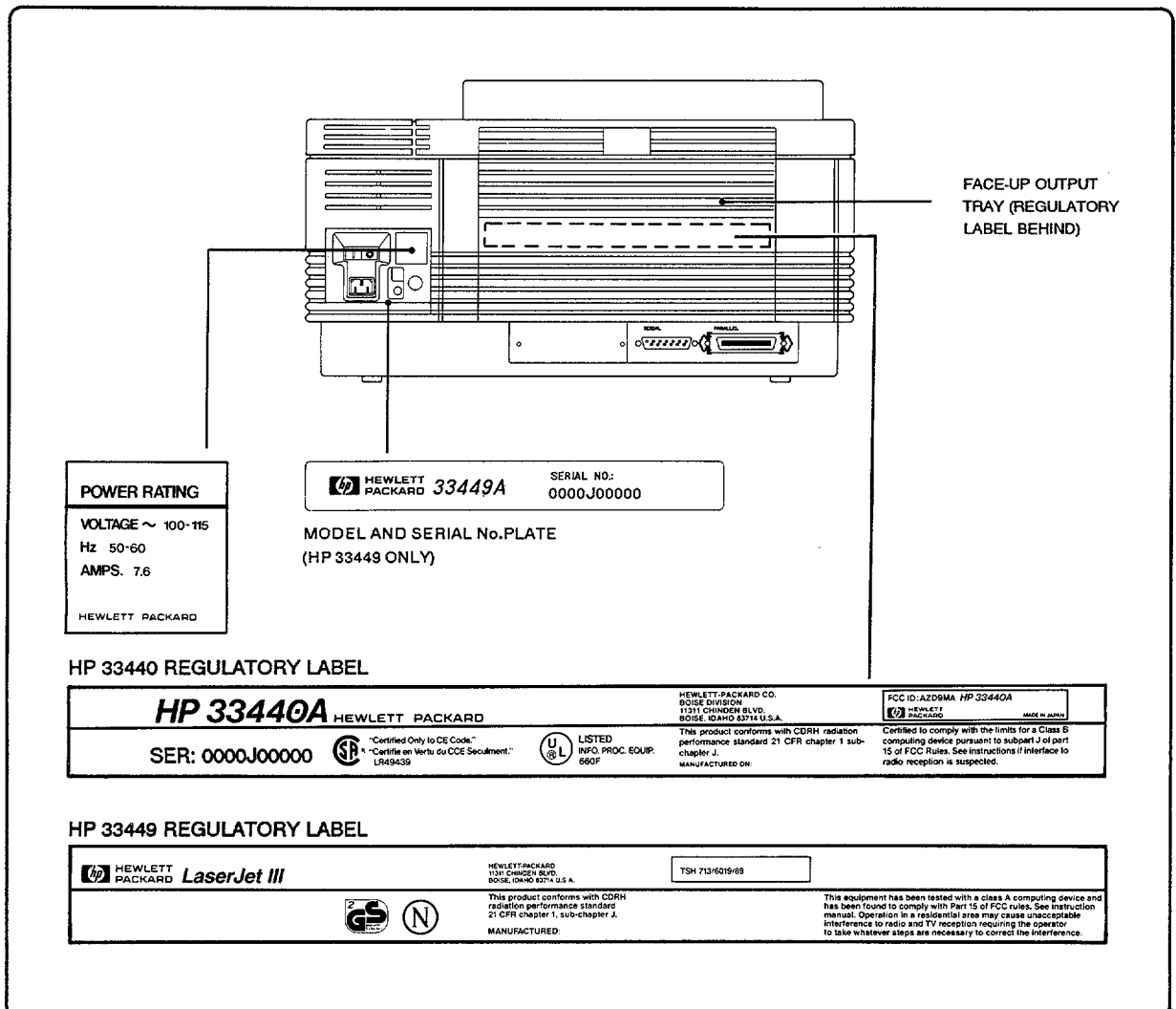


Figure 1-1. Printer Identification and Power Rating

1-3. SPECIFICATIONS

Physical Dimensions

Table 1-1. Physical Dimensions

Specification	HP 33440	HP 33449
Width	45.4 cm (17.9 in.)	46.0 cm (18.1 in.)
Depth (body only)	48.2 cm (19.0 in.)	49.7 cm (19.6 in.)
Depth (with letter tray)	62.7 cm (24.7 in.)	64.1 cm (25.2 in.)
Height	23.2 cm (9.13 in.)	25.2 cm (9.9 in.)
Weight*	23.3 kg (51 lbs)	24.8 kg (54.6 lbs)
*Includes power cord, empty letter-size paper tray, EP-S Cartridge, and printer.		

Electrical Specifications

Table 1-2. Electrical Specifications*

Specification	HP 33440A & HP 33449A	HP 33440AB/AU & HP 33449AB
Voltage	100 V or 115 V \pm 10%	220 V or 240 V \pm 10%
Frequencies	50 or 60 Hz \pm 2 Hz	50 Hz \pm 2 Hz
Current, Steady State	8.7 A at 100 V 7.6 A at 115 V	3.4 A at 220 V 3.1 A at 240 V
Power, Printing Maximum	870 Watts at 115 V 3000 BTU/hr	850 Watts at 220 V 2900 BTU/hr
Power, Standby	170 Watts at 115 V 580 BTU/hr	170 Watts at 220 V 580 BTU/hr
* With no accessories installed.		

Note



The HP 33440A and HP 33449A (50/60 Hz) have a transformer that automatically adjusts for 100 or 115 volts; the HP 33440AB/AU and HP 33449AB (50 Hz) automatically adjust for 220 or 240 volts.

Environmental Specifications

Table 1-3. Environmental Specifications

Environmental Factor	Condition	HP 33440 and HP 33449
Temperature	Operating: *Storage:	10 to 32.5° C (50 to 91° F) 0 to 35° C (32 to 95° F)

Table 1-3. Environmental Specifications (continued)

Environmental Factor	Condition	HP 33440 and HP 33449
Humidity	Operating: *Non-Operating:	20 to 80% RH 10 to 80% RH
Altitude	Operating: *Non-Operating:	0 to 4,600m (0 to 15,100 ft) 0 to 15,300m (0 to 50,200 ft)
Audible Noise	Printing: Standby:	5.8 B L _{WAd} (1 B = 10 dB) 42.9 dB L _{PAm} (bystander at 4 positions) 5.0 B L _{WAd} (1 B = 10 dB) 33.3 dB L _{PAm} (bystander at 4 positions)
* Printer only, not EP-S Cartridge. See Chapter 2, Section 2-3 for EP-S Cartridge.		

1-4. RELATED DOCUMENTATION

The following documents provide additional information about the HP 33440 and HP 33449 printers:

HP 33440

Shipped with printer:

- *LaserJet series II Printer Getting Started Manual* (P/N 33440-90908). (Replaced by *Your Road Map to setting up Your LaserJet series II Printer*, P/N 33440-90004, in November 1989; included here as Appendix A.)
- *LaserJet series II Printer User's Manual* (P/N 33440-90901). (English language version.)
- *LaserJet series II Software Application Notes* (P/N 33440-90006). (U.S. only.)
- *LaserJet series II Printer Technical Reference Manual* (P/N 33440-90905).

Additional information:

- *LaserJet series II Printer Paper Specification Guide* (P/N 5954-7339).
- *Peripherals Handbook Insert* (P/N 33440-90906).
- *Self-Paced Training Guide and Final Review* (P/N 33449+49A-90101).

HP 33449

Shipped with printer:

- *Your Guide to Setting up Your LaserJet III* (P/N 33449-90905); included here as Appendix B.
- *LaserJet III Printer User's Manual* (P/N 33449-90901). (English language version.)
- *LaserJet III Software Application Notes* (P/N 33449-90917). (U.S. only.)
- *LaserJet III User's Quick Reference Guide* (P/N 33449-90902).

Additional information:

- *Peripherals Handbook Insert* (P/N 33449-90908).
- *Self-Paced Training Guide and Final Review* (P/N 33449+49A-90101).
- *LaserJet III Technical Quick Reference Guide* (P/N 33449-90904).
- *LaserJet III Technical Reference Manual* (P/N 33449-90903).

1-5. SAFETY AND RELATED INFORMATION

General

The HP 33440 and HP 33449 printers are UL 478 listed, CSA 22.2 154 certified, and manufactured in accordance with DIN IEC 380/IEC 435. Where necessary, warning labels are affixed to the printer wherever special service attention is needed.

Warning



Because the printers contain potentially hazardous voltages, accessories such as watches and rings should be removed before working on the printers.

Laser Safety

The both printers are certified as Class 1 laser products under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that they do not produce hazardous laser radiation. Both printers also comply with the Center for Devices and Radiological Health (CDRH) regulations. Since laser light emitted inside the printer is completely confined within protective housings and external covers and further contained by an interlock system, the laser beam cannot escape during any phase of normal user operation.

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured since August 1, 1976. Compliance is mandatory for products marketed in the United States. The label below (see Figure 1-2) indicates compliance with CDRH regulations and must be attached to laser products marketed in the United States. European models all comply with or meet IEC 825 for laser safety.

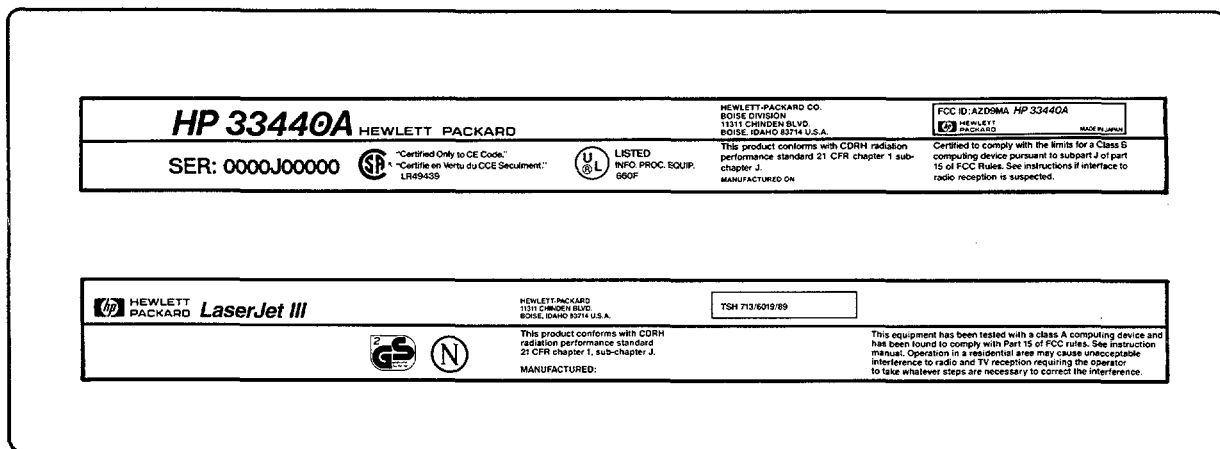


Figure 1-2. Printer Regulatory Labels

Warning



When servicing or adjusting the printer's optical system, do not place screwdrivers or other shiny objects in the path of the laser beam. Although invisible, the reflected beam can cause permanent eye damage.

Where there is danger of exposure to laser radiation, the following label is attached inside printer covers:

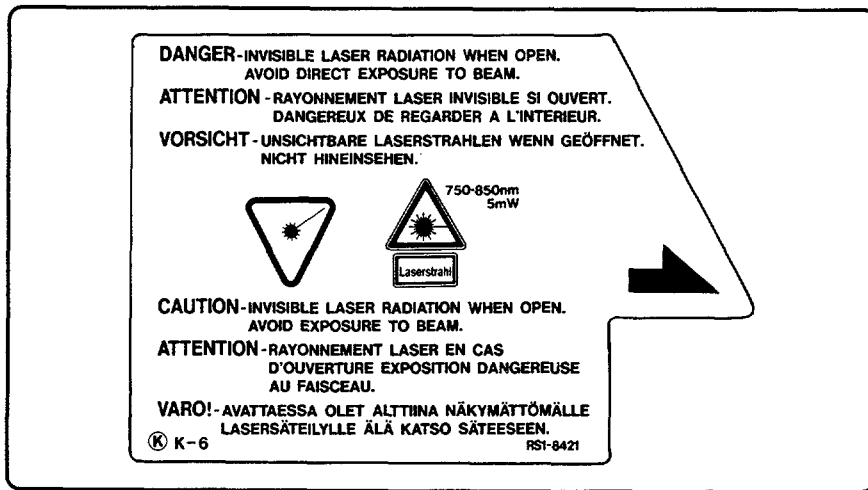


Figure 1-3. Laser Safety Label Example

Finnish Laser Statement

The following notice is required to be printed in Finnish.

TURVALLISUUSYHTEENVETO

LASERTURVALLISUUS

HP 33440AB ja HP 33449AB laserkirjoittimet ovat käyttäjän kannalta turvallisia luokan 1 laserlaitteita. Laitteet on tarkastanut Suomessa Työterveyslaitos ja tyyppihyväksynyt Työsuojeluhallitus, Työsuojeluhallituksen hyväksyntänumerot

HP 33440AB: TSH 1563/6019/87

HP 33449AB: TSH 713/6019/89

Tarkastuksessa laitteiden turvallisuusluokka on määrätty valtioneuvoston päätöksen N:o 472/1985 ja standardin SFS-IEC 825 mukaisesti.

Normaalikäytössä laitteen suojakotelo estää lasersäteen pääsyn laitteen ulkopuolelle.

HUOLTO

Kirjoittimien sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteet saa avata ja huoltaa ainoastaan laserlaitteiden huoltamiseen koulutettu henkilö. Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttöohjeessa lueteltuja, käyttäjän tehtäväksi tarkoitettuja ylläpitotoimia.

Kirjoittimien turvallisuusluokitus muuttuu mikäli niiden suojakotelo avataan. Laitteiden sisällä olevassa laseryksikössä on laseriodi, joka laitteen toimiessa lähettää silmälle näkymätöntä, luokan 3B lasersäteilyä.

Figure 1-4. Finnish Laser Statement

German ZZF Declaration

The following notice, which is required to be printed in German, applies to printer operation and servicing in Germany:

Funkentstörung Deutschland Herstellerbescheinigung

Hiermit wird bescheinigt, daß das Gerät HP 33440 oder HP 33449 in Übereinstimmung mit den Bestimmungen von *Postverfügung 1046/84* funkentstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Wird das Gerät innerhalb einer Anlage betrieben:

- So muß bei Inanspruchnahme der Allgemeinen *Genehmigung FTZ 1046/84* die gesamte Anlage der oben genannten Genehmigung entsprechen.
- Die mit einer *FTZ-Serienprüfnummer* gekennzeichnet ist, und für die eine Betriebsgenehmigung vorliegt oder beantragt wird, so sind in der Regel keine weiteren Schritte notwendig.

Figure 1-5. West German ZZF Declaration

FCC Regulations

Federal Communications Commission (FCC) Radio Frequency Interference (RFI) Statement

This equipment generates and uses radio frequency energy. If not installed, serviced, and used properly (that is, in strict accordance with the manufacturer's instructions), it may cause interference to radio and television reception. The equipment has been type tested and found to comply within the limits set for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation.

Note Use of a shielded interface cable is required for compliance to fall within the Class B limits in Subpart J of Part 15 of FCC rules.



No guarantee can be given that interference with radio or television reception will not occur in a particular installation. If this equipment does cause interference – which can be determined by turning the equipment off and on – try to correct it by using the following measures:

- Reorient the radio or television antenna.
- Reorient the device with respect to the radio or television receiver.
- Move the device away from the receiver.
- Plug the device into a different outlet so it is on a different branch circuit than the receiver.

If necessary, consult your dealer or an experienced radio/television technician for additional suggestions. The Federal Communications Commission has prepared a booklet entitled *Interference Handbook* (1986) (stock number 004-000-004505-7) which may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Ozone Emission

General

The corona assemblies found in laser printers and photocopiers generate ozone gas (O_3) as a by-product of the electrophotographic process. Ozone is only generated while the printer is actually printing (i.e., while the corona assembly is energized). Underwriters Laboratory (UL) has established a standard for ozone emissions. All LaserJet printers meet this standard when shipped from the factory.

Employer Responsibilities

Because ozone can be an irritant, various regulatory agencies have established limits to the amount of ozone to which employees may be exposed. *The employer should provide a work environment that meets the following standards:*

- A person may not be exposed to an average concentration of greater than 0.1 part per million (PPM) of ozone for a period of eight hours.
- At this time, the American Conference of Governmental Industrial Hygienists (ACGIH) has proposed a ceiling limit of 0.1 PPM for ozone.

Recommendations for Minimizing Ozone Exposure

Almost all ozone concerns arise from abnormal site or operating conditions. The following conditions may generate an ozone complaint:

- Multiple laser printers in a confined area.
- Extremely low relative humidity.
- Poor room ventilation.
- Printer exhaust port directed toward the faces of personnel.
- Existing Ozone Filter in need of replacement (see Chapter 4).
- Long, continuous printing combined with any of the above conditions.

Inspect your work environment for the operating conditions listed above if you believe ozone emissions are a problem in your area. Some people may be extremely sensitive to ozone odor. If this situation is encountered, it is advisable to position the printer away from the sensitive user.

Toner Safety and Care

Toner is a nontoxic substance composed of plastic, iron, and a small amount of pigment. Care should be taken to avoid breathing toner particles. To clean toner from skin and clothing, remove as much toner as possible with a vacuum or dry tissue wipes, then wash the toner from skin or clothing with *cold* water. Hot water makes toner very difficult to remove. Because toner tends to be degraded by vinyl materials, contact with vinyl should be avoided.

1-6. PRINTER PARTS OVERVIEW

Since the location of major components is similar for both printers, only the HP 33449 is shown here. For an HP 33440-specific parts overview, see Chapter 6.

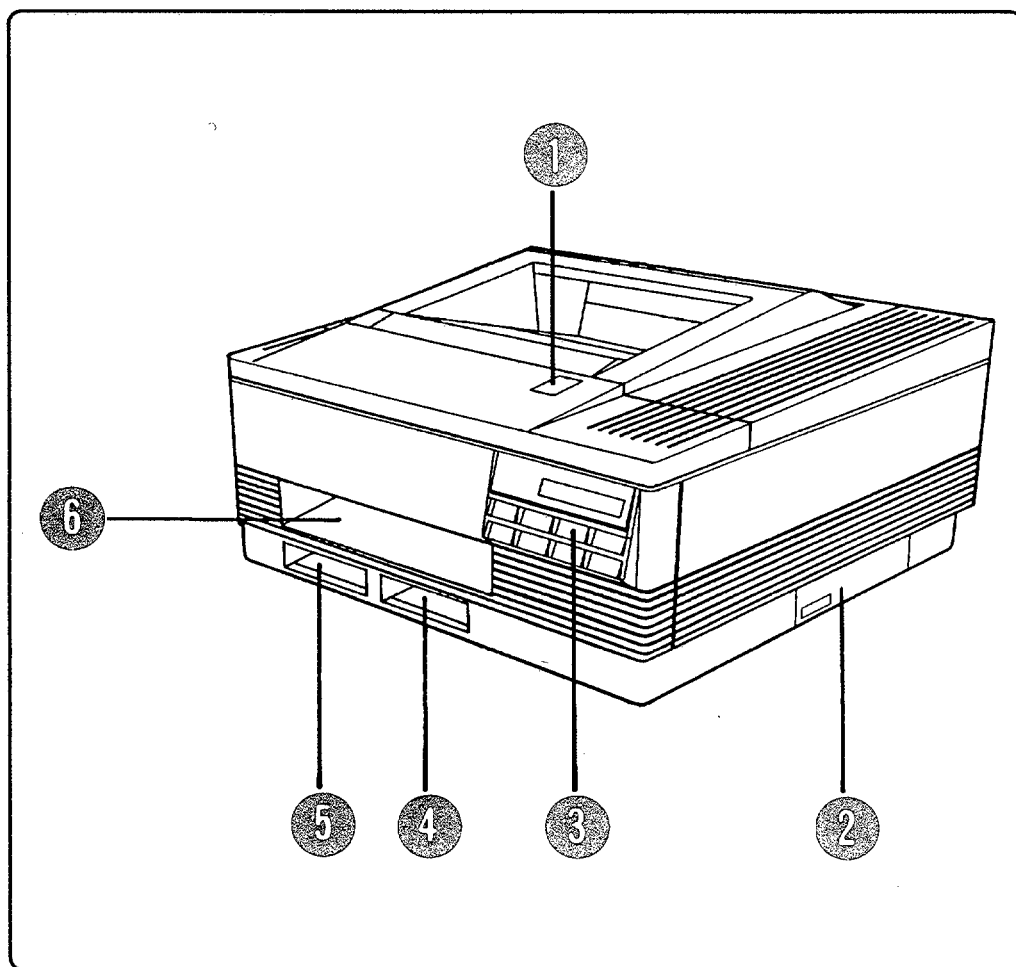


Figure 1-6.
HP 33449 Printer
(Front and Right Side View)

1. Top Cover Release Button.
2. Test Print Button (under panel on HP 33449).
3. Control Panel.
4. Right Cartridge Slot.
5. Left Cartridge Slot.
6. Paper Tray Slot.

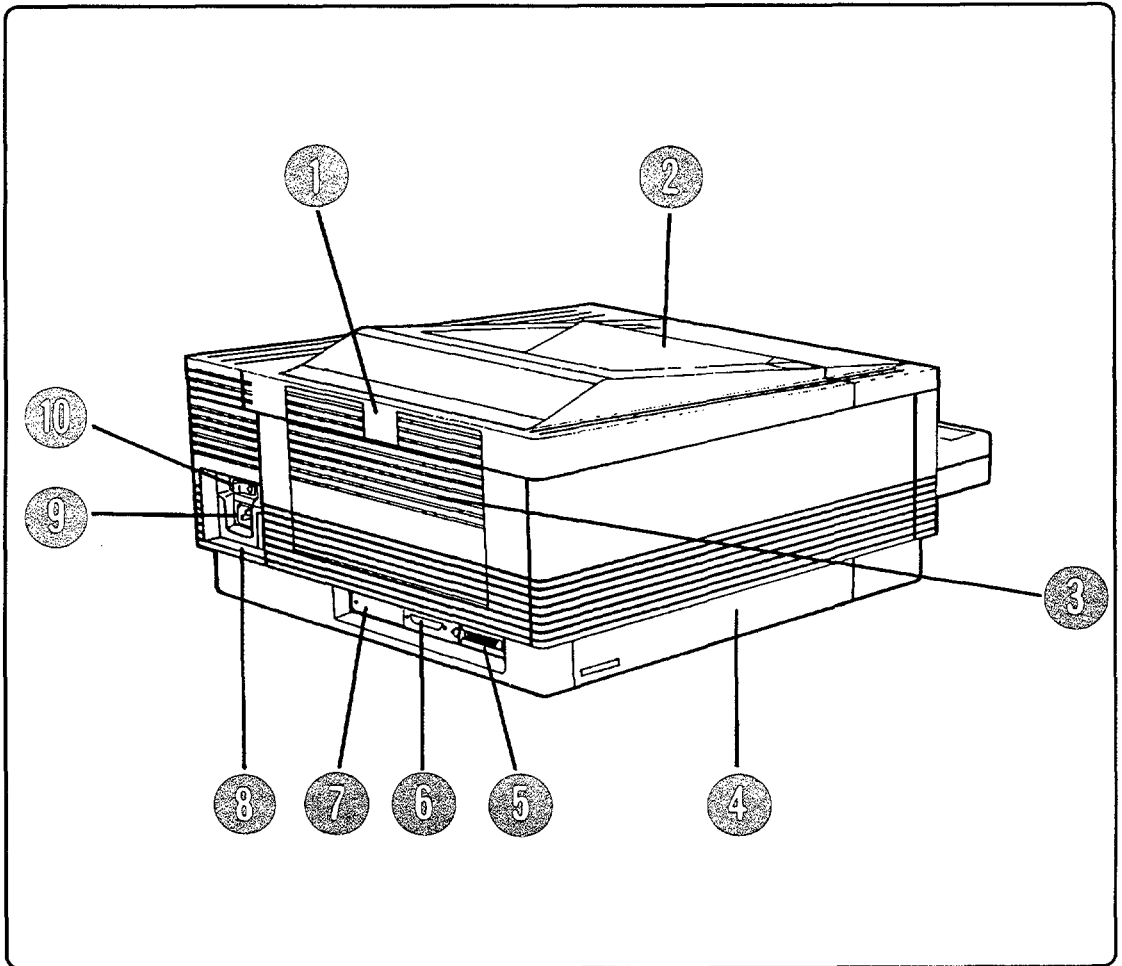


Figure 1-7.
HP 33449 Printer
(Rear View)

1. Rear (Face-Up) Output Tray Release.
2. Top (Face-Down) Output Tray.
3. Rear (Face-Up) Output Tray (closed).
4. Expansion Memory Slot(s) (one in HP 33440, two in HP 33449).
5. Parallel Port.
6. Serial Port.
7. Optional Interface Slot.
8. Serial Number (HP 33449) (On Regulatory Label for HP 33440).
9. Power Connector Socket.
10. Power Switch.

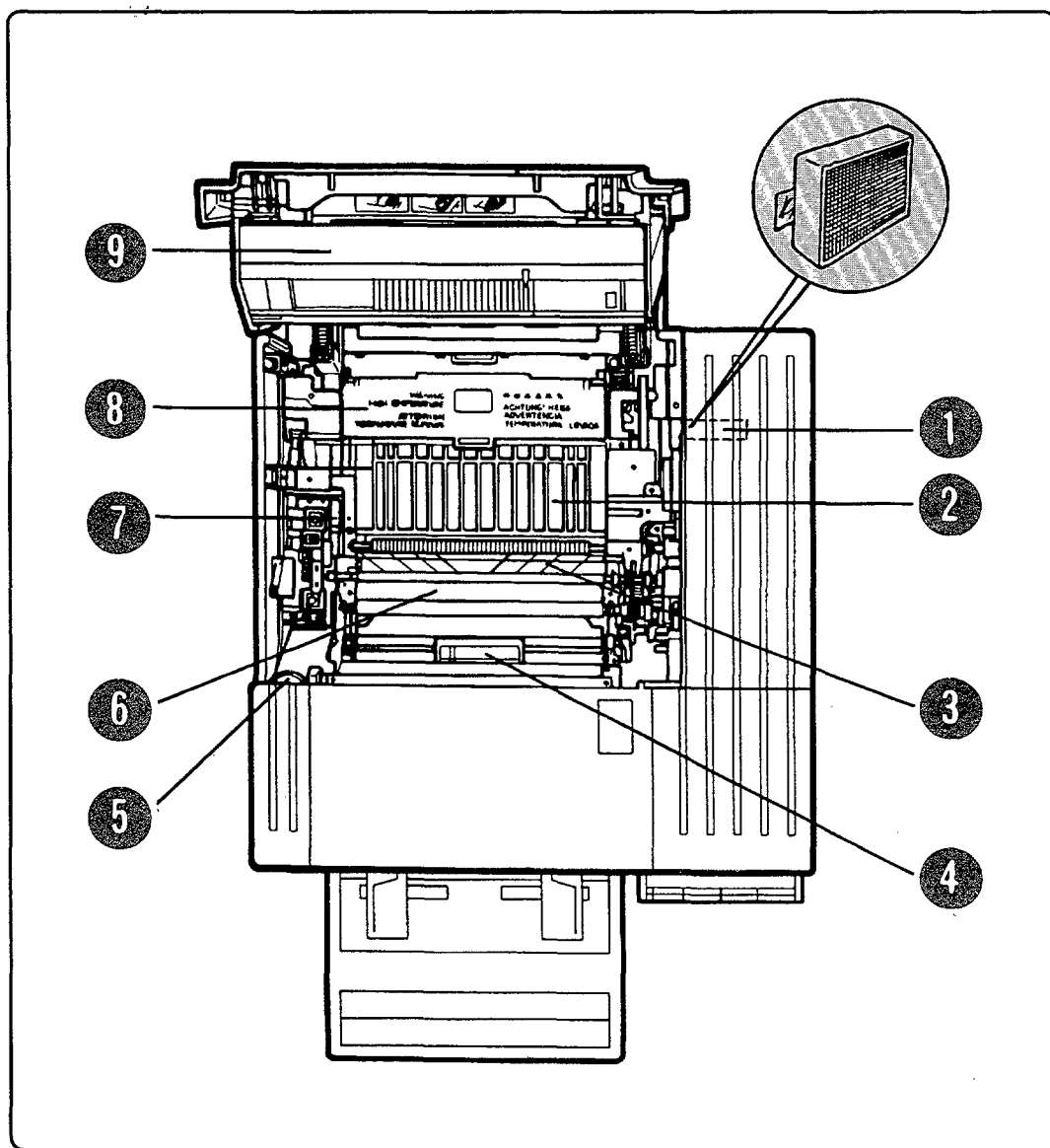


Figure 1-8.
HP 33449 Printer
(Internal View)

1. Ozone Filter.
2. Feed Guide Assembly.
3. Transfer Corona Assembly.
4. Transfer Guide Lock Tray.
5. Print Density Dial.
6. Transfer Guide Strip.
7. Cleaning Brush.
8. Fusing Assembly.
9. EP-S Cartridge.

1-7. CONTROL PANEL OVERVIEW

General

Since key names and functions for both printers are essentially the same, the table of key assignments below applies to both printers. A complete overview of Control Panel functions with regard to service needs is given in Chapter 3. For a detailed overview designed for users, see the *LaserJet series II Printer User's Manual* or the *LaserJet III User's Manual*.

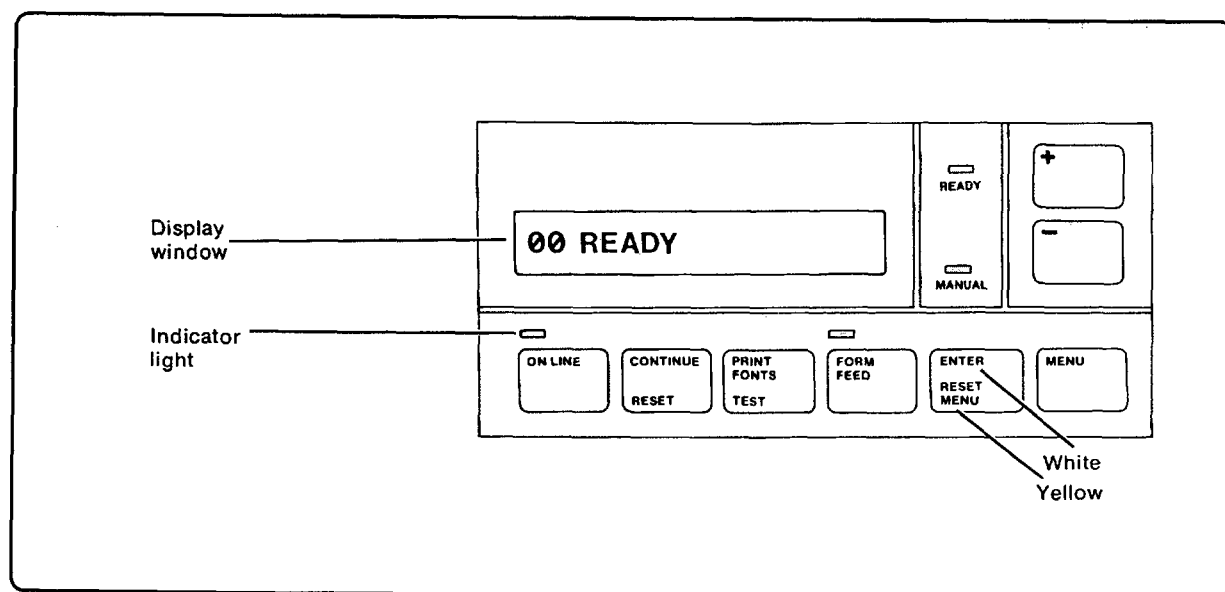


Figure 1-9. HP 33440 Control Panel

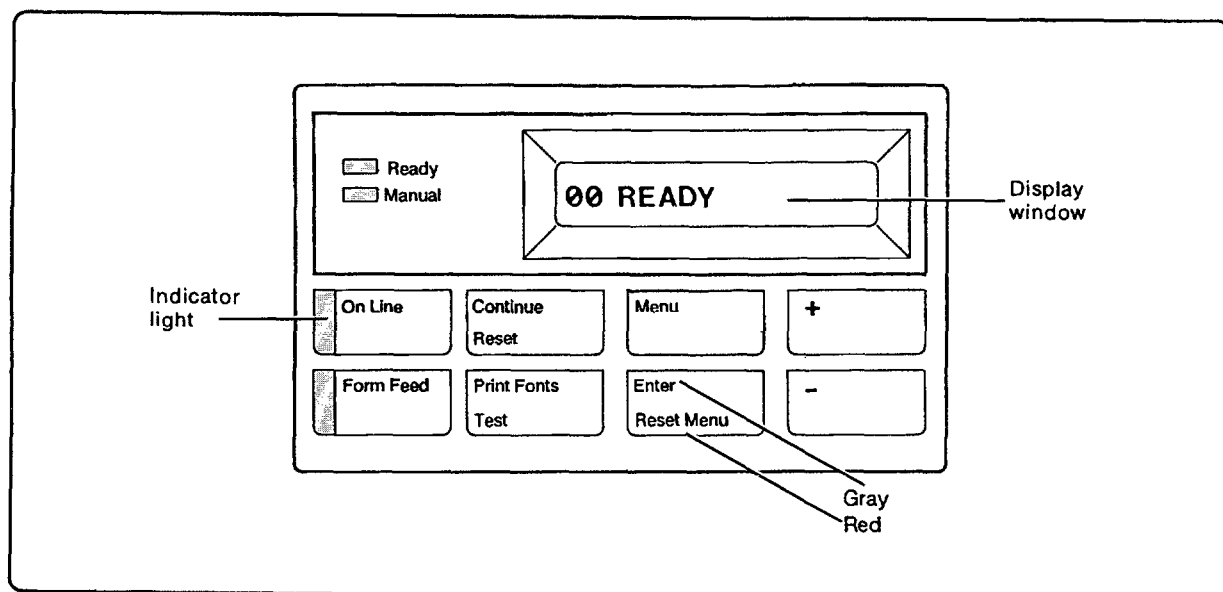


Figure 1-10. HP 33449 Control Panel

Table 1-4.
Key Functions
HP 33440 and HP 33449 Printers

Keys	Description
ON LINE	Turns printer <i>on line</i> and <i>off line</i> . When <i>on line</i> , the indicator light is on and the printer can receive data. When <i>off line</i> , other Control Panel functions can be performed.
CONTINUE/RESET	<p>CONTINUE Briefly pressing this key clears most errors and returns printer to on-line status. Will also reprint lost pages due to correctable error conditions.</p> <p>RESET Holding down key until 07 RESET is displayed (2 – 5 seconds) resets the printer, returning all printing settings to Control Panel settings and clearing temporary soft fonts, macros, and stored page data.</p>
PRINT FONTS/TEST	<p>PRINT FONTS Briefly pressing this key gives a printout of sample characters from currently available fonts.</p> <p>TEST Holding down key until 05 SELF TEST is displayed tests the controller and prints a test printout. If key is held down longer, 04 SELF TEST is displayed and continuous test prints are made (press ON LINE again to stop test print process).</p>
FORM FEED	Form feed light indicates that page data is stored in printer's memory. Pressing FORM FEED prints all stored data.
MENU	<p>Accesses and steps through Printing and Configuration Menus.</p> <p>Pressing MENU enters the Printing Menu (COPIES= is displayed).</p> <p>Holding down MENU (about 5 seconds) until SYM SET= (HP 33440) or AUTO CONT= (HP 33449) is displayed enters the Configuration Menu.</p>
ENTER/RESET MENU	<p>ENTER Pressing key saves a Menu choice while in the Printing or Configuration Menus.</p> <p>RESET MENU Holding down key until 09 MENU RESET is displayed returns Printing Menu configuration to factory defaults.</p>
+ or -	Pressing + or - will increment or decrement menu item choices. Holding down a key will scroll through choices.

Table 1-5.
Control Panel Indicators
HP 33440 and HP 33449 Printers

Indicator	Description
On Line Indicator	When the amber LED adjacent to the ON LINE key shows a steady light, the printer is on line, indicating that it is ready to receive data. The printer should be on line after it has been turned on and warmed up.
Form Feed Indicator	The amber FORM FEED indicator adjacent to the FORM FEED key will light whenever page data is stored in the printer's memory and flash when this data is being printed.
Ready Indicator	The green READY indicator is lit when the printer is on and ready to print. When the light is flashing, the printer is receiving data or processing data already received.
Manual Indicator	The amber MANUAL indicator is lit when manual feed has been selected from the Control Panel or through a software application.

1-8. SERVICE APPROACH

Overview

The basis for repair for both the HP 33440 and HP 33449 printers centers on the modular-level replacement of electro-mechanical assemblies and some associated components as well as the assembly-level replacement of printed circuit assemblies (PCAs). For both printers, the diagnostics and this document together aid in isolating problem areas. After location, the problem assembly or component should be replaced without further attempts to identify failures within the component or assembly.

Repair Parts

For both printers, an exchange program for Interface/Formatter PCAs, DC Controller PCAs, optional memory PCAs, and the Fusing Assembly will be available. All other failed PCAs will normally be discarded when discovered to be defective. Service parts may be ordered from Hewlett-Packard's Support Materials Organization (SMO) or Parts Center Europe (PCE). Part numbers can be found in Chapter 8 of this document.

Support Materials Organization
 3625 Cincinnati Avenue
 Rocklin, California 95677-1297
 (800) 227-8164

Parts Center Europe
 Wolf-Hirth Strasse 33
 D-7030 Boeblingen, West Germany
 0049-7031-140

Consumables and Accessories

Consumables may be ordered from Hewlett-Packard's Direct Marketing Division (DMK) and are often available through an authorized Hewlett-Packard dealer. The telephone number for DMK is 800-538-8787 (In California: 408-738-4133).

Although they should not be used as a part of normal repair operations, more common consumable and accessory part numbers can be found in Chapter 8 of this manual. Current font cartridges, cables, and miscellaneous accessories and part numbers can be obtained by calling the DMK number above and requesting a current catalog.

1-9. WARRANTY STATEMENT

General

The following material is taken from the *LaserJet III Printer User's Manual* with only slight changes. Unless specifically noted, it applies to the LaserJet series II as well.

Warranty

This warranty gives you specific legal rights. You may also have other rights which vary from state to state or province to province.

One-Year Limited Warranty

Hewlett-Packard warrants its computer hardware products against defects in materials and workmanship for a period of one year from receipt by the end user. During the warranty period, HP will, at its option, either repair or replace products which prove to be defective.

Should HP be unable to repair or replace the product within a reasonable amount of time, a refund of the purchase price may be given upon return of the product.

Exclusions

The warranty on your LaserJet III printer shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer.
- Customer-supplied software or interfacing.
- Unauthorized modification or misuse.
- Operation outside of the environmental specifications for the product.
- Operation of non-supported printing media.
- Duty cycle abuse (see note on next page).
- Operating the printer from a mechanical switchbox without a designated surge protector.
- Improper site preparation and maintenance.
- Use of non-Hewlett-Packard EP-S Cartridges, memory boards, or interface boards.

Note

Operation of the printer beyond the limit of its duty cycle (printing greater than the equivalent of 12,000 (HP 33440) or 16,000 (HP 33449) single-sided pages per month) shall be deemed printer abuse and all repairs thereafter will be billed on a time and materials basis.

If you are using a mechanical switchbox, ensure that it is equipped with a surge protector. Damage to your printer could occur from the use of unprotected mechanical switchboxes.

The warranty period begins either on the date of delivery or, where the purchase price includes installation by Hewlett-Packard, on the date of installation.

Your LaserJet III printer must be serviced by one of the authorized repair depots within the country of original purchase. Customer shall prepay shipping charges (and shall pay all duty and taxes) for products returned for service. Except for products returned to the customer from another country, Hewlett-Packard shall pay for return of products to the customer. If the unit is repaired by an authorized dealer, you will need to negotiate the method and cost of returning the unit with the dealer.

You may convert your one-year warranty to a 90-day on-site service agreement any time within 90 days of purchase. Contact your dealer or HP Sales Representative for details regarding this option.

Warranty Limitations

The warranty set forth above is exclusive and no other warranty, whether written or oral, is expressed or implied. Hewlett-Packard specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. However, any implied warranty of merchantability or fitness is limited to the one-year duration of this written warranty.

Service During the Warranty Period

If your hardware should fail during the warranty period, bring the equipment to an authorized HP Dealer Repair Center or send the equipment to one of the HP Field Repair Centers.

When sending equipment to an HP Field Repair Center or Dealer Repair Center, follow the repacking guidelines listed below. Also, complete and enclose the Service Information Form beginning on page 8-9 (HP 33449 only) of the *User's Manual*. Insuring the equipment for shipment is recommended.

Warning

Shipping damage as a result of inadequate packaging is the customer's responsibility. Use the original packing materials whenever possible.

Service After the Warranty Period

If your hardware fails after the warranty period, contact an Authorized HP Dealer Repair Center. If you have an HP Maintenance Agreement, request service under your agreement.

When sending equipment to an HP Field Repair Center, follow the repacking guidelines (listed in the *User's Manual*). Also, complete and enclose the Service Information Form (in the *User's Manual*) and enclose a copy of proof of purchase. Insuring the equipment for shipment is recommended.

Repacking Guidelines for Returning Your Printer

- Remove any font cartridges installed in the printer.
- Remove the EP-S Cartridge and the Fuser Cleaning Pad.
- Remove any non-HP accessories (if installed).
- Remove paper trays, but include them in the box with the printer.
- Use the original shipping container and packing materials, if possible.
- Include the completed Service Information Form. Include print samples which illustrate the problems you are having, if applicable.
- Include 50-100 sheets of any problem paper or forms, if possible.

Note



If you have already disposed of your printer's packaging material and are unable to locate another package, the packaging can be ordered from HP's Support Materials Organization at the following phone numbers:

United States: 800-227-8164

Canada: 416-678-9430

Europe: 41-22-83-81-11

Ask for part number 33440-00908 for the HP 33440 or 33449-00908 for the HP 33449. The proper packaging material (box and inserts) will be sent to you for a nominal charge. (For further packaging information on both printers, see Chapter 3, Section 3-2 of this manual or Appendix A (HP 33440) or Appendix B (HP 33449).)

SITE PLANNING AND REQUIREMENTS

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2-1. INTRODUCTION

HP 33440 and HP 33449 printers are carefully adjusted and inspected before they are shipped. To maintain the performance level set at the factory, correct selection of a location is extremely important. The service representative should fully understand the functions of the printers to ensure selection of a suitable location.

2-2. SITE REQUIREMENTS

The HP 33440 and HP 33449 printers are designed to operate in a clean environment, preferably in an area not subject to excessive mechanical shock, vibration, or a wide range of temperatures. Although air conditioning and power conditioning are not required to ensure reliable operation, the environmental specifications listed in Chapter 1, Section 1-3, should not be exceeded.

The following suggestions should be taken into consideration prior to installation:

- The printer should not be installed near water faucets, humidifiers, refrigerators, or similar devices that affect the environment. A location where the temperature changes abruptly, such as near an air conditioner, should also be avoided.
- The printer should not be exposed to open flames, dust, ammonia fumes, and direct sunlight or other excessively bright light source at anytime.
- The room should be well ventilated.
- The printer should be installed on a sturdy, level surface.
- Sufficient space should be provided to permit unimpeded printer operation and adequate ventilation (see Figure 2-1).

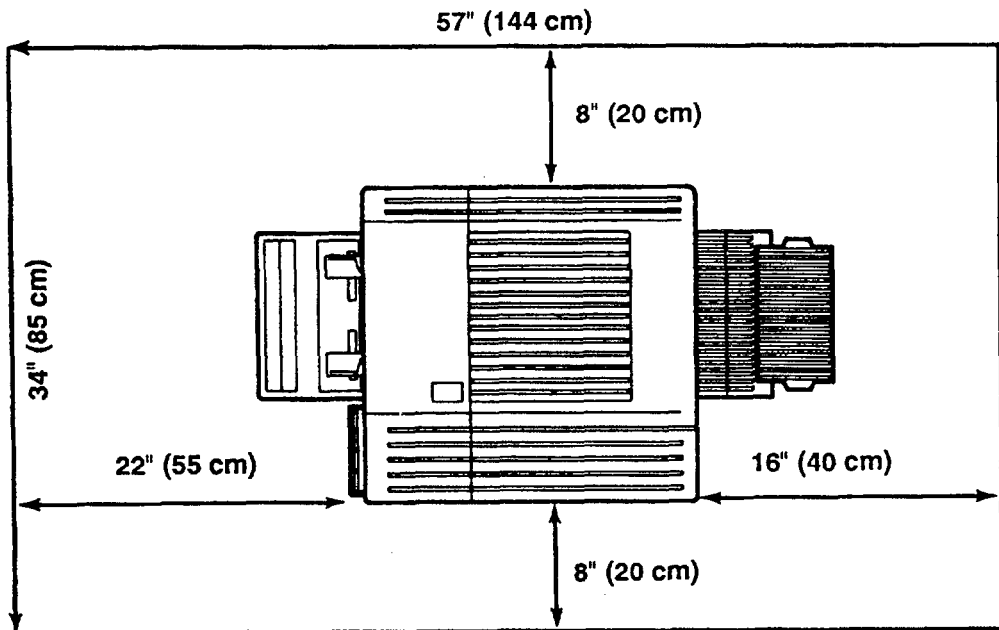


Figure 2-1. Printer Space Requirements

2-3. STORING AND HANDLING EP-S CARTRIDGES

The EP-S Cartridge can be adversely affected by the environment and time. Careful attention should be given to the following information about storing and handling cartridges.

Storage with Packaging Intact

The following conditions should be observed:

1. Keep the EP-S Cartridge out of direct sunlight or other bright light.
2. Keep the EP-S Cartridge on a secure, level surface where it is not likely to be bumped.

Under warehouse conditions, be sure the storage area meets the conditions in Table 2-1.

Table 2-1. EP-S Cartridge Storage Conditions With Packaging Intact

Category	Temperature	Humidity	Air Pressure
Normal Conditions (2.45 Years)	0° to 35° C	35 to 85% RH	460 to 760 mm Hg (0.6 to 1 atm)
Severe Conditions (18 Days)	High: 35° to 40° C Low: -20° to 0° C	High: 85 to 95% RH Low: 10 to 35% RH	460 to 760 mm Hg (0.6 to 1 atm)
Maximum Temperature Change (3-Minute Period)	High: 40° to 15° C Low: -20° to 25° C	n/a	n/a
Total Storage Time (Storage + Use): 2.5 years			

Storage After Opening Packaging

The drum in the EP-S Cartridge uses a photosensitive organic coating that deteriorates when exposed to strong light. The toner in the EP-S Cartridge can also be affected by the environment. For these reasons, the customer must be fully informed about the correct method for storing and handling the cartridge. **The EP-S Cartridge must be fully used within six months after it has been removed from its packaging.**

Storage Conditions

1. Do not place cartridges in direct sunlight or near a window. Also, do not leave them inside an automobile for a long period of time in warm weather. (These conditions apply even if the cartridge is still in its package.)
2. In addition to avoiding areas with constant high or low temperatures or relative humidity (as listed in Table 2-1), avoid locations subject to abrupt changes in either temperature or humidity, such as near an air conditioner.
3. Do not store cartridges in dusty locations and avoid exposure to ammonia gas or other organic solvent vapors.
4. Do not store the EP-S Cartridge above 35° C (95° F).
5. **Never expose the cartridge to temperatures above 40° C (104° F).**

Note



The expiration date specified on the cartridge box is 2.5 years (storage time plus use time) after the date of manufacture, assuming an intact storage bag. If the bag is broken, the maximum storage-plus-usage time is six months.

Handling Suggestions

1. When installing a cartridge, slowly rock it 45 degrees about its long axis (see Figure 2-2) about five times to distribute the toner evenly.
2. As shown in Figure 2-2, do not stand the cartridge upright, invert it, or handle it roughly.

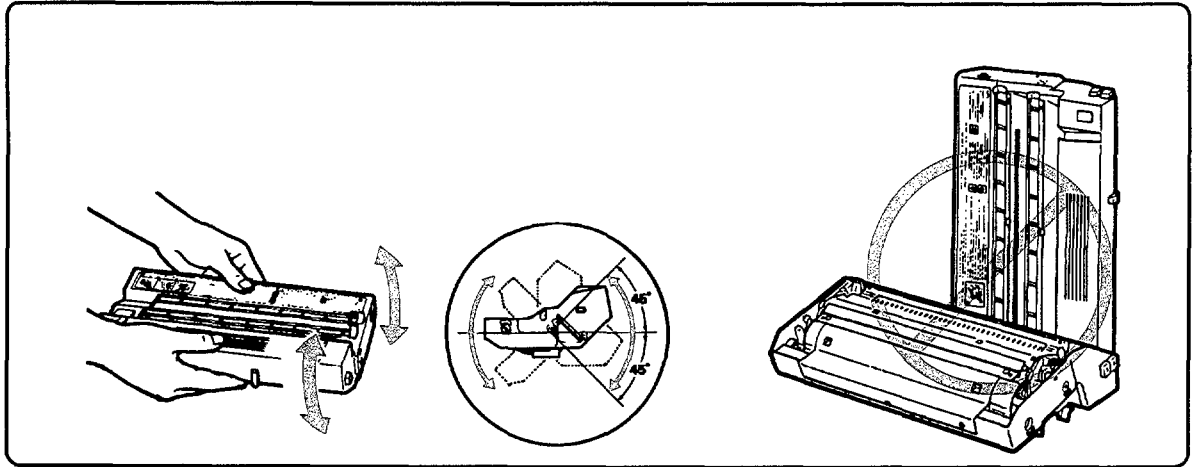


Figure 2-2. Toner Distribution and Storage

3. Do not touch the surface of the drum when opening its protective shield on the bottom of the EP-S Cartridge. If it becomes absolutely necessary to clean the drum, use only toner applied with a dry cloth. *Do not wipe with a dry cloth and do not use any solvents.*
4. Do not attempt to disassemble or refill the EP-S Cartridge.
5. Do not expose a cartridge to unnecessary vibration or mechanical shock.
6. Although an EP-S Cartridge has light-blocking shutters to protect the photosensitive drum, exposure to light for a long period of time may cause light or white areas to appear on prints. If this happens, stop the printer and wait a few minutes. This should eliminate the problem. In extreme cases, some life may be restored to the drum by placing the EP-S Cartridge in a dark place for an extended period of time. If drum exposure has been excessive, the EP-S Cartridge may require replacement.
7. If it becomes necessary to rotate the drum, always turn it in the same direction it turns while making prints. If it is turned backward, the spring-loaded contact that applies the developing bias to the inside rim of the developing cylinder may be bent backward so that it no longer contacts the cylinder, thus preventing proper image development.

Note



Normal room light, measured a few meters from a window on an average day, is about 1,500 lux. Do not expose the photosensitive drum to light of this intensity for more than five minutes. If accidentally exposed under these conditions, the EP-S Cartridge can be stored in a dark place to recuperate, although an image may be retained on the drum for some time. Direct sunlight is 10,000-30,000 lux. A drum exposed to light of this intensity may be permanently damaged.

2-4. PAPER SPECIFICATIONS

General

HP 33440 and HP 33449 printers are designed to work well with most types of xerographic and bond paper. However, some paper variables may have a significant effect on print quality or handling reliability. Use of the following guidelines when choosing paper will ensure maximum printer performance.

Paper Types to Use

To obtain the clearest, sharpest images, paper manufactured for photocopying, such as Canon NP or Xerox 4024, should be used. Generally, these types of papers are manufactured to specifications that provide desirable characteristics for laser printer image quality and paper handling. The supplier should be informed that the paper or envelopes are to be used in a laser printer. Always test samples of the paper before buying to ensure that it provides desirable performance. Preprinted papers should use inks that can withstand the temperature of the printer's fusing process.

For some applications, cotton bond paper may be preferred. Several cotton papers are now being manufactured with properties optimized for laser printing. HP has tested cotton content papers such as Gilbert Neu-Tech and Neenah NP with satisfactory results. Many other types of cotton bonds will work well in these printers. However, always test paper to ensure desirable performance. Paper having a rougher surface, such as cockle or laid finished paper, or paper that is wrinkled or puckered may exhibit degraded performance.

Note



HP neither warrants nor recommends the use of any particular paper. Paper properties are subject to change by paper manufacturers, and HP has no control over such changes. The operator is responsible for the quality and performance of paper used with the printer.

Paper Types to Avoid

Some specific types of paper may not perform well or may damage the printer. (See also "Envelopes Types to Avoid" in Section 2-5.)

Paper types to avoid are:

- Those not meeting the specifications given in Table 2-2.
- Extremely smooth or shiny paper, or paper that is highly textured.
- Coated or chemically finished papers.
- Damaged or wrinkled paper, or paper with irregularities such as tabs and staples.
- Letterheads using low temperature dyes or thermography. These materials may transfer onto the fusing roller and cause damage. Any preprinted paper should use inks able to withstand 200° C (392° F) for 0.1 second.
- Multipart forms or carbonless paper.

Caution



Damage or other defects caused by the use of papers listed under "Paper Types to Avoid" above and media with tabs, clasps, staples, or other objects attached to them will not be covered by HP warranty or standard HP service agreements.

Table 2-2. Paper Specifications

Item	Specification
Acid Content	5.5 pH to 8.0 pH.
Ash Content	Not to exceed 10%.
Basis Weight:	60 to 135 g/m ² (16 to 36 lb.).
Brightness	83% minimum.
Caliper	3.0 to 7.0 mils (0.076 to 0.18 mm).
Furnish	100% chemical wood pulp and/or cotton fiber.
Curl	Ream: Flat within 0.3" (8 mm). Printed: Flat within 0.8" (20 mm).
Cut Edge Conditions	Cut with sharp blades with no visible fray.
Electrical Surfaces Resistivity	2.0 to 15 x 10 ¹⁰ ohms/sq. (conditioned @ 23°C & 50% RH).
Electrical Volume Resistivity	1.2 to 15 x 10 ¹¹ ohms x cm (conditioned @ 23°C and 50% RH).
Finishing	Cut sheet to within ±0.031 in. (.79 mm) of nominal, corners 90° ±0.2°.
Fusing Compatibility	Must not scorch, melt, transfer material, or release hazardous emissions when heated to 200°C (392° F) for 0.1 second. Any pre-printed sheets must use inks compatible with the fusing process.
Grain	Long grain.
Moisture Content	4% to 6% by weight.
Opacity	85% minimum.
Packaging	Polylaminated moisture-proof ream wrap.
Smoothness	60 to 250 (Sheffield). (The rougher surfaces tend to degrade print quality.)
Stiffness	1.6 to 7.5 machine direction. 0.6 to 3.5 cross direction (Taber).
Wax Pick	12 minimum (Dennison).

2-5. ENVELOPE SPECIFICATIONS

General

A wide variety of envelopes have been tested and most have performed acceptably. However, some envelopes will not feed through the printer because of their construction. A suitable envelope should have not more than two thicknesses of paper along the leading edge (the edge that enters the printer first, see Figure 2-3) and the leading edge should be straight with a sharp, well-creased fold. Flimsy envelopes lacking stiffness or those having curved leading edges will not reliably feed into the printer. Also, envelopes having “baggy” construction may wrinkle while going through the printer’s fuser. Poor results also occur when envelopes are folded smaller than normal, causing a thick leading edge near a corner. The folding accuracy of some manufacturers’ envelopes may vary enough to cause some envelopes to feed well and other, apparently similar, envelopes to jam.

Note The Face Up (rear) Output Tray – the most direct path for envelopes and other media – should be used to reduce wrinkling and curl.



Envelope Procurement Recommendations

Purchase quality envelopes only from a supplier who understands that the envelopes will be used in a laser printer. Envelopes should lie flat, have folds that are consistent and sharp, and be packaged in a protective box. Envelope samples should be tested before purchasing.

Consistent, long-term performance requires quality control from the envelope manufacturer and proper handling until use. Envelopes should be stored where they will lie flat and the edges will not be damaged. They should be kept away from extremes in temperature and humidity and should be allowed to reach room temperature before use.

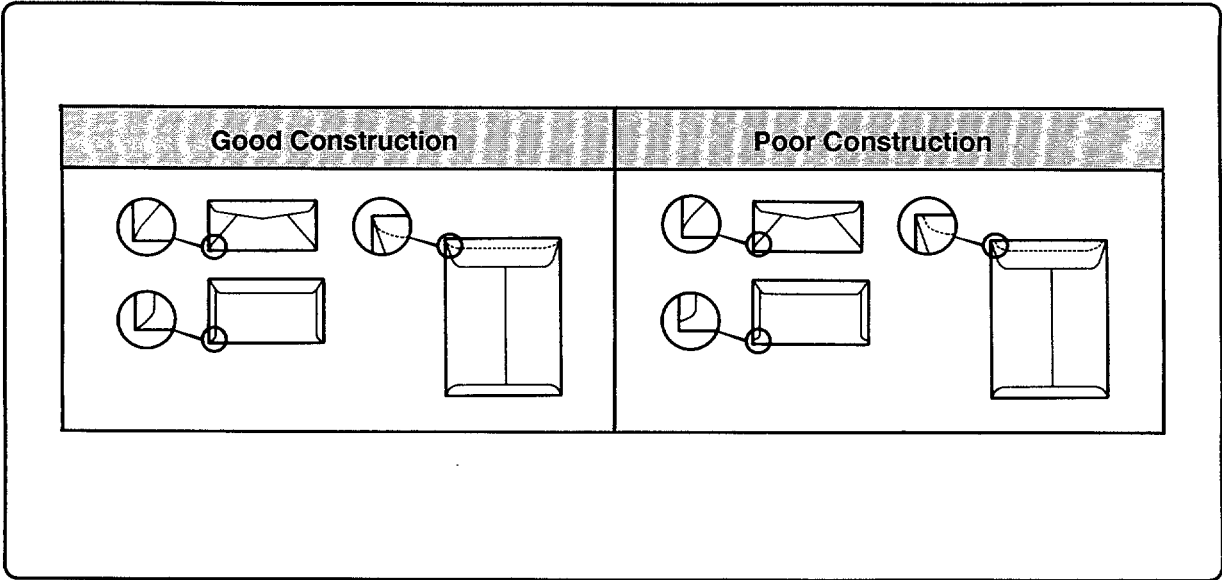


Figure 2-3. Good and Poor Envelope Construction

Envelope Types To Avoid

- Envelopes that do not meet the specifications listed in Table 2-3.
- Envelopes constructed of paper with weight greater than 24 pounds (90 g/m²).
- Poorly manufactured envelopes with leading edges having more than two thicknesses of paper and that are not consistently square and straight (see Figure 2-3).
- Envelopes with “baggy” construction or folds that are not sharply creased.
- Envelopes that have already been printed on with a LaserJet printer.
- Envelopes with clasps, snaps, or tie strings.
- Envelopes with transparent windows, holes, perforations, or cutouts.
- Envelopes using paper, inks, adhesives, or other materials that discolor, melt, transfer material, or release hazardous emissions when exposed to 200° C (392° F) for 0.1 second.
- Envelopes made with extremely smooth, shiny, or recycled paper.
- Envelopes that are very rough, highly textured, or deeply embossed.
- Envelopes which do not lie flat or that are damaged, curled, wrinkled, or irregularly shaped.
- Envelopes having an open flap with adhesive exposed so that closing the flap seals the envelope.
- Envelopes that use encapsulated types of adhesive that do not require moistening but instead rely on pressure to seal them.

Caution



Under *no circumstances* should envelopes with clasps, snaps, windows, or synthetic materials be used; *severe damage may occur to the printer*. Such damage is not covered by HP warranty or standard HP service agreements.

Envelope Construction and Size

Both the HP 33440 and HP 33449 use an adjustable envelope cassette. Standard envelope sizes that can be used are:

Commercial 10:	4 $\frac{1}{8}$ " x 9 $\frac{1}{2}$ "
Monarch:	3 $\frac{7}{8}$ " x 7 $\frac{1}{2}$ "
C5:	162 mm x 229 mm
International DL:	110mm x 220mm

Non-standard envelopes that fall within the following size ranges can also be used:

Minimum size:	3.5" x 7.5" (89 mm x 190 mm).
Maximum size:	7.2" x 10.1" (182 mm x 257 mm).

Note

Hewlett-Packard neither warrants nor recommends the use of a particular envelope because envelope properties are subject to change by envelope manufacturers. Hewlett-Packard has no control over such changes. The entire responsibility for the quality and performance of envelopes lies with the customer.

Although testing helps to characterize an envelope's performance, long-term satisfaction requires process quality control by the envelope's manufacturer and proper handling until use.

Envelopes should meet the specifications listed in the following table:

Table 2-3. Envelope Specifications

Item	Specification
Basis Weight	16 to 24 pounds (17" x 22" per 500 sheets) (60 to 90 grams/sq. meter).
Caliper	3.3 to 5.5 mils (0.084 to 0.14 mm) single layer thickness.
Curl	Must lie flat with less than 0.25" (0.064 mm) curl across entire surface.
Finishing	Envelopes must be accurately (+0.04" (0.01 mm) of normal) folded so there are no more than two thicknesses of paper at the leading edge. All folds must be sharply creased and construction must be tight.
Furnish	100% chemical wood pulp and/or cotton.
Fusing Compatibility	Must not scorch, melt, offset, or release hazardous emissions when heated to 200° C (392° F) for 0.1 second.
Moisture Content	4% to 6% by weight.
Paper	Paper used for envelope construction must meet all the paper specifications listed in Table 2-2.
Smoothness	100 to 250 (Sheffield). (The rougher surfaces tend to degrade print quality.)

Note

Envelope performance in both the HP 33440 and HP 33449 printers may be influenced by properties other than those specified here. True verification of performance requires actually running the envelope through the printer. Consistent, acceptable, long-term performance of envelopes in this printer requires careful process quality control by the envelope manufacturer and proper handling until use by the customer.

2-6. ADHESIVE LABEL AND OVERHEAD TRANSPARENCY SPECIFICATIONS

HP 33440 and HP 33449 printers will also print on certain adhesive label and overhead transparency media. (Label and transparency part numbers have been listed as of this printing; contact DMK for current information.)

Caution



Use of labels and transparencies not designed for the HP 33440 or HP 33449 printers may result in damage not covered by HP warranty or standard HP service agreements. *Use only labels and overhead transparencies recommended for use in laser printers.*

Adhesive Labels

An adhesive label is paper with a pressure-sensitive adhesive backing. The three components of label stock are the top or face sheet (the actual label), the adhesive, and the liner or carrier sheet, sometimes referred to as the backing. *Use the rear output tray when printing labels to reduce curl.*

The elements of label stock include:

- Top or Face Sheets:** The top sheet, which is the printing surface, is usually composed of photocopy paper.
- Carrier Sheet:** The carrier sheet should be bleached sulfate stock, silicone coated for easy release of the face sheet.
- Adhesive:** The adhesive should be acrylic-based since such material is more stable than other adhesives at the high temperatures encountered in the printer's fusing process.

Warning



Air quality testing has been conducted on a similar Hewlett-Packard printing product in accordance with National Institute for Occupational Safety and Health (NIOSH) test procedures and standards. As a result of this testing, only labels using an acrylic-based adhesive are recommended for use.

Adhesives should not come in direct contact with any part of the printer because the label stock may stick to the photosensitive drum or the rollers, causing toner offset or paper jams. No adhesive should be exposed between the labels. To test label stock for adhesive exposure, a sheet of plain paper should not adhere when pressed against a sheet of label stock.

- **Label arrangement:** Labels should be arranged on the carrier sheet so that they cover the entire page, *with the only exposed spaces being lengthwise down the sheet*. Using label stock with spaces between labels often results in labels peeling off during the printing cycle, causing serious jamming problems. Do not remove any excess top sheet material from the carrier sheet until after printing. These precautions will help prevent problems resulting from labels pulling loose from the carrier sheet.
- **Label curl:** Labels must lie flat with no more than $\frac{1}{2}$ inch of curl in any direction.
- **Poorly manufactured labels:** Do not use labels having wrinkles, bubbles or other indications of delamination; they may result in damage to the printer due to labels peeling off.

Table 2-4. Adhesive Label Specifications

Specification	Description
Face Sheet	Must meet specifications in Table 2-2.
Fusing Compatibility	All adhesives, liners, facestocks and other materials used in the label construction must be compatible with the heat and pressure of the fusing process. Materials must not discolor, melt, offset material or release hazardous emissions when heated to 200°C (392° F) for 0.1 seconds.
Construction	Total construction caliper must not exceed 0.0070 inches (0.18mm).

HP has tested labels—such as Avery labels specified for laser printers and Hewlett-Packard LaserJet labels—and found their performance to be satisfactory.

Hewlett-Packard Labels (8 $\frac{1}{2}$ " x 11", 100 Sheets):

- | | |
|--------------------------------------|---|
| ■ P/N 92296A: 1" x 2 $\frac{5}{8}$ " | ■ P/N 92296F: $\frac{1}{2}$ " x 1 $\frac{3}{4}$ " |
| ■ P/N 92296B: 1 $\frac{1}{3}$ " x 4" | ■ P/N 92296G: $\frac{2}{3}$ " x 3 $\frac{7}{16}$ " |
| ■ P/N 92296C: 1" x 4" | ■ P/N 92296H: 2 $\frac{3}{4}$ " x 2 $\frac{3}{4}$ " |
| ■ P/N 92296D: 2" x 4" | ■ P/N 92296J: 1 $\frac{1}{2}$ " x 4" |
| ■ P/N 92296E: 3 $\frac{1}{3}$ " x 4" | ■ P/N 92296K: 8 $\frac{1}{2}$ " x 11" |

Caution



Remove each label immediately after printing. Because they may stick together due to their heat retention properties, do not allow them to stack up in the paper tray. *Always use the Face-Up (Rear) Output Tray to prevent possible label jams and resultant damage to the printer.*

Overhead Transparencies

Hewlett-Packard has tested overhead transparency film such as HP overhead transparencies and found the performance acceptable. *Use the rear output tray when printing transparencies to reduce curl.* Overhead transparencies should meet the specifications provided in Table 2-5.

Table 2-5. Transparency Specifications

Thickness	0.100 to 0.110 mm	3.9 to 4.5 mils
Cutting Dimension Tolerance	± 0.7 mm	0.031 inch
Cutting Angle	90° ± 0.2°	

Hewlett-Packard offers the following overhead transparencies through its Direct Marketing Division:

- P/N 92296T: 8 $\frac{1}{2}$ " x 11", 50 Sheets
- P/N 92296U: A4 (210 mm x 297 mm), 50 Sheets

INSTALLATION AND CONFIGURATION

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3-1. INTRODUCTION

Two basic topics are discussed in this chapter:

- Unpacking and Installation.
- Using the Control Panel to configure the printer and to check printer functions.

Each printer is carefully inspected before it is shipped. Proper installation is extremely important to maintain printer performance at the level set at the factory. The service representative should fully understand the operating environment parameters of the printer to ensure that it is properly installed in a suitable location (see Chapters 1 and 2). A thorough knowledge of the Control Panel is necessary to understand default settings, restart routines, and the font and other printouts—as well as to use the Printing and Configuration Menus, run self tests, and use the service mode.

Since their physical appearance is quite similar, the HP 33449 has generally been used to represent both printers. If there is a significant difference, appropriate instructions for both printers have been added.

3-2. UNPACKING AND INSTALLATION

Unpacking Instructions

Note



ALL packaging material should be retained in case the printer needs to be repackaged for shipment at a later date. For both printers, packaging material to be saved includes all cardboard and foam materials. Replacement packaging material is available through SMO (800-227-8164) or PCE (0049-7031-140). Part numbers are 33440-00908 for the HP 33440 and 33449-00908 for the HP 33449.

Although unpacking and installation instructions for the HP 33440 and HP 33449 printers are quite similar, there are some differences. For the HP 33440, refer to Appendix A for the pamphlet, *Your Road Map to setting up Your LaserJet series II Printer*, which was packaged with printers after November 1989. (The *Getting Started Manual* was packaged with printers before November 1989.) The pamphlet, *Your Guide to Setting up Your LaserJet III*, which is shipped with the printer, is included here as Appendix B.

Prior to unpacking either printer, examine the shipping container for any signs of physical damage (holes in the container, large indentations, etc.). If damage to the shipping container is evident, request that the carrier's agent be present when the printer is unpacked. The recipient assumes all liability for shipping damages once the box has been opened.

Warning



Take care when unpacking and handling the printer. Because both the HP 33440 and HP 33449 printers weigh approximately 50 pounds (22.4 Kg), two people may be required to lift a printer from its packaging or move it around the workspace.

Hardware Installation

General

Ensure that the printer's site environment meets all the specifications in Chapter 1 and Chapter 2. Refer to the appropriate appendix for actual hardware installation instructions – Appendix A for the HP 33440 and Appendix B for the HP 33449. The HP 33440 factory interface default is serial; the HP 33449 default interface is parallel. Decide at this time which interface connection will be used based upon the host system's capabilities and the proximity of the printer to its host. Configure the printer accordingly.

Interface Cabling

Typical cabling diagrams can be found in Appendix D for both serial and parallel (Centronics) configurations. HP part numbers for cables used in MS-DOS environments can be found in Appendix A (for the HP 33440) or Appendix B (for the HP 33449).

Serial Interface Setup

For both printers, to reconfigure from parallel interface to serial or to change the baud rate, etc., follow these instructions:

1. Make sure both the computer and printer are switched off.
2. Connect the serial cable between the printer and the computer.
3. Switch the printer on.
4. Take the printer off line.
5. Hold the **MENU** key down (about 5 seconds) until SYM SET= (HP 33440) or AUTO CONT= (HP 33449) is displayed.
6. Press the **MENU** key once until I/O= is displayed. (To change the display, press the **+** or **-** key to display I/O=SERIAL and then press the **ENTER** key to save the selection.)
7. **HP 33440 only:** Press the **MENU** key to show BAUD RATE= .
8. **HP 33449 only:** Press the **MENU** key to show SERIAL= and select SERIAL=RS-232; then press the **MENU** key again to show BAUD RATE= .
9. Press the **+** or **-** keys if the baud rate needs to be changed to match the host computer's baud rate.
10. Press the **ENTER** key to save the selection.
11. Press the **MENU** key to show ROBUST XON= . If ROBUST XON=OFF* (XON=DC1) appears, press the **+** key to display ON and press the **ENTER** key to save the selection. (See the note below for additional information on ROBUST XON configuration.)
12. Press the **MENU** key to show DTR POLARITY= . Select the proper polarity (normally HI, determined by the host). (**Note:** DTR polarity is only configurable when the selected I/O type is Serial and Serial is set to RS-232.)
13. Return the printer to on-line status by pressing **ON LINE**.

Note

The ROBUST XON configuration determines the method by which the printer generates XONs (DC1s). If ROBUST XON is ON, an XON is transmitted by the controller to the host system when (1) the controller's 1-Kbyte I/O buffer has less than 128 data bytes remaining, (2) the printer is in an on-line state, and (3) the printer is not busy. If no data is received within approximately one second, then additional XONs are transmitted at one second intervals until data is received.

If ROBUST XON is OFF, the printer sends a single XON whenever (1) the printer can accept more data following an XOFF (DC3), (2) the printer returns to an on-line state, and (3) the printer is not busy. The printer does not send XONs every second while the printer is on line and ready for more data.

RS-422 Configuration

HP 33440: To select RS-422 operation, remove the two screws securing the plate labeled "OPTIONAL I/O" on the lower rear section of the printer (see Figure 3-1). Move SW1 on the Interface PCA from the DOWN to the UP position. When I/O=SERIAL is selected from the printer's Configuration Menu, RS-422 protocol, rather than RS-232, will be in effect.

HP 33449: RS-422 communication is selected through the Control Panel's Configuration Menu.

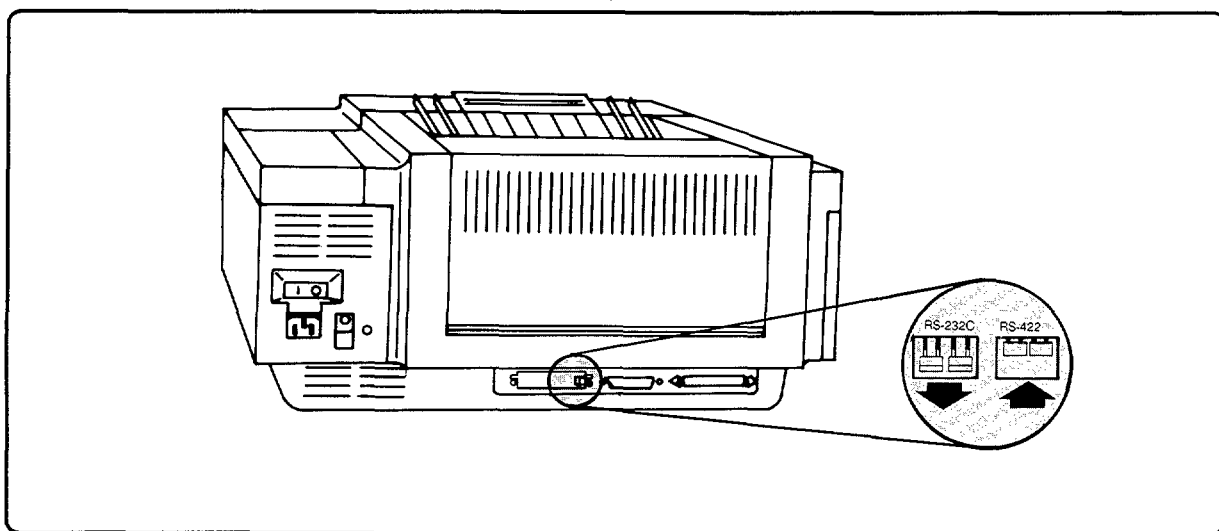


Figure 3-1. Setting HP 33440 Switches

Software Installation

Once the printer has been properly installed and appropriately cabled to its host system, the host system will need to be configured to communicate with the printer. Following are guidelines for MS-DOS-based systems. Assuming a serial connection on systems based on an operating system other than MS-DOS, the host must be configurable using the following protocol:

Word Size:	8-bit.
Start Bits:	1.
Stop Bits:	1.
Parity:	None.
Handshaking:	Hardware (using DTR) or XON/XOFF. (Hardware handshaking is not available using the RS-422A configuration.)

The polarity (HI or LO) of the DTR signal line can be configured at the printer to match the host system's requirements. The baud rate (bits per second) setting of both printer and host system must match. In the printer's Configuration Menu, ROBUST XON should be set to ON, unless the host system is unable to handle repeating XON's (DC1's) at the rate of approximately one per second whenever the printer is ready to receive data. Setting ROBUST XON to OFF will cause the printer to issue only a single XON when it comes on line or following an XOFF when its I/O buffer can once again accommodate additional data.

Note

The HP 33440 has the additional capability of responding to a "status request" sequence ([ESC] ? [DC1]), providing compatibility with system drivers that issue such requests. This capability can be added to the HP 33449 using an Optional I/O Interface. Contact your HP sales representative for more information.

MS-DOS System Configuration

To communicate properly with the printer, the MS-DOS environment will require the addition/modification of MODE commands in the AUTOEXEC.BAT file. Add or modify the MODE command(s), depending on the interface configuration, as follows:

- Parallel** **MODE LPT n , , P** where n is the parallel port designator to which the cable is attached (typically 1 or 2). (This command sequence retries sending output if timeout errors occur.)
- Serial** **MODE COM n : [baud rate \div 100] , N , 8 , 1 , P** where n is the serial port designator to which the cable is attached (typically 1, 2, 3, or 4). (This command sequence sets baud rate, parity, number of data bits and stop bits, and retries on time-out errors.)
- MODE LPT1:=COM n .** (With this command sequence, any output sent to "LPT1" is redirected to the serial port.)

Since the MODE command is an external MS-DOS command (i.e., a program named MODE.COM is run when the command is invoked), the program file must be contained in the root directory or in a directory specified in a preceding PATH command in the AUTOEXEC.BAT file.

Once modification to the AUTOEXEC.BAT file has been made, the computer must be rebooted for the changes to take effect.

Note

Some PC software applications override these MS-DOS configurations set using the MODE command. These applications must also be configured appropriately to communicate properly with the printer.

In Case of Difficulty

If the preceding steps have been followed and the printer and host have matching configuration parameters set but the printer is not operating as expected, refer to the "Interface Troubleshooting" section in Chapter 7, Section 7-6.

3-3. USING THE CONTROL PANEL

Overview

Control Panel operation for the HP 33440 and HP 33449 printers is quite similar. Although the HP 33440 uses a membrane-type keypad and the HP 33449 uses a set of raised keys with a slightly different arrangement (see Figure 3-2), the keys and indicators as well as most of the functions displayed are the same.

The HP 33449 adds the following features:

- **Localization:** Five languages (English, French, German, Italian, and Spanish) can be chosen for display, self test, and font printout messages.
- **Scalable Typefaces:** Pitch or point size can be selected from the Printing Menu if the chosen font is a scalable typeface.
- **Expanded Symbol Sets:** An expanded list of symbol sets is offered. Symbol set selection appears in the Printing Menu, not the Configuration Menu as in the HP 33440.
- **Resolution Enhancement:**TM This HP proprietary technology improves the visual quality of printed images beyond the 300 dpi standard.
- **Page Protection:** This feature, with the addition of at least 1 Mbyte of expansion memory, reserves additional memory to ensure that an entire page will be printed, regardless of its complexity.

Note that, for both printers, some keys have a lower function label which indicates a second or, for some keys, a third functional level. Pressing keys briefly accesses the top level of Control Panel functions. Holding down keys for a number of seconds accesses a second or third level of Control Panel functions. Remember that, with the exception of the **ON LINE** key, **the printer must be off line to use the Control Panel.**

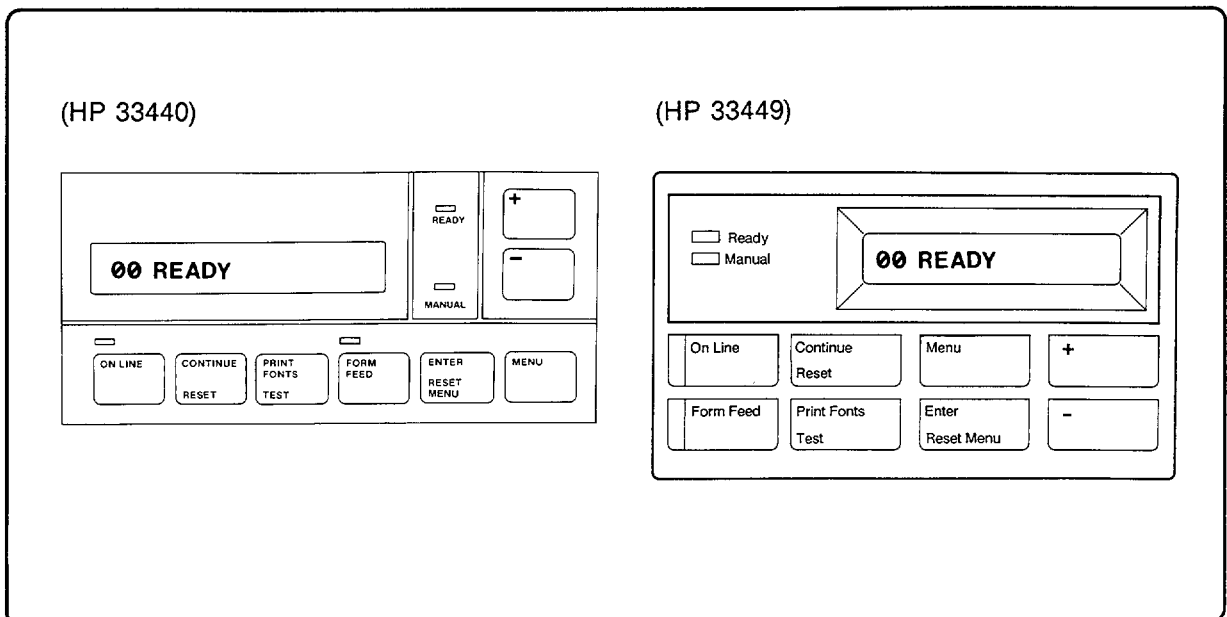


Figure 3-2. Control Panels

Control Panel Functional Description

General

The HP 33440 and HP 33449 operator control panels consist of eight keys, one green LED indicator (READY), three amber LED indicators (ON LINE, FORM FEED, MANUAL), and a one-line by 16-character LCD display.

The functional descriptions which follow apply to both the HP 33440 and HP 33449 printers unless otherwise specified. Since timing for key press duration may differ slightly, the durations given should be taken as a general indication only. For the HP 33449, display messages are localized (i.e., they appear in the selected display language) unless otherwise noted.

Indicator Descriptions

On Line Indicator	When the amber LED adjacent to the ON LINE key shows a steady light, the printer is on line, indicating that it is ready to receive data. The printer should be on line after it has been turned on and warmed up. When on line and printing, use of the ON LINE key does not result in an immediate off-line indication. The ON LINE LED flashes and the Control Panel does not respond to further operator requests until buffered pages have finished printing.
Form Feed Indicator	The amber FORM FEED indicator adjacent to the FORM FEED key will light whenever page data is stored in the printer's memory. <i>Do not turn the printer off when the form feed indicator is on or the data stored in memory will be lost.</i> Use the FORM FEED key to print stored data if the READY indicator shows a steady light and the FORM FEED indicator is lit. While the page is being printed, the FORM FEED indicator will flash.
Ready Indicator	The green READY indicator is lit when the printer is on and ready to print. When the light is flashing, the printer is receiving data or processing data already received. In order for the printer to receive data, it must be on line and ready. When the ready indicator light is off, an error, status, or attendance message will be displayed.
Manual Indicator	The amber MANUAL indicator is lit when manual feed has been selected from the Control Panel or through a software application.

Key Descriptions

On Line Key:

ON LINE

The printer can be switched from on-line to off-line status by pressing the **ON LINE** key. To receive data, the printer must be on line. To use the other keys on the Control Panel, the printer must be off line. Note that when on line and printing, use of the **ON LINE** key does not result in an immediate off-line state; response is delayed until paper motion is finished, although data transfer between the printer and host ceases at the time the key is pressed.

Continue/Reset Key: The **CONTINUE/RESET** key has two modes:

CONTINUE

Briefly pressing the **CONTINUE/RESET** key clears most errors (except hardware errors) and returns the printer to on-line status after an error condition or device attendance request. The **continue** aspect of the key overrides manual feed and media size requests and resumes printing following recoverable error conditions.

RESET

Holding down the **CONTINUE/RESET** key until 07 RESET is displayed (about two seconds) returns all current printing settings to Control Panel settings (see "Resetting the Printer"). A Control Panel reset also clears temporary soft fonts, temporary macros, and stored page data.

Print Fonts/Test Key:

PRINT FONTS

Briefly pressing the **PRINT FONTS/TEST** key causes several pages to be printed showing sample characters from all available fonts. The display will show 06 FONT PRINTOUT while the pages are printing. (See Figure 3-5 (HP 33440) or Figure 3-6 (HP 33449) for an example and explanation of the font printout.)

TEST

Holding down the **PRINT FONTS/TEST** key until 05 SELF TEST is displayed (about two seconds for the HP 33440 and about three seconds for the HP 33449) causes the printer to test its built-in controller and to create a test printout. During the test, all the Control Panel indicators light up. When the printing portion of the test begins, 06 PRINTING TEST is displayed. When the test is completed, 00 READY is displayed. (If an error occurs during the test, an error message will be displayed instead.)

If the **PRINT FONTS/TEST** key is held down for at least five seconds (until 04 SELF TEST is displayed), test printouts will be continuously printed until the **ON LINE** key is pressed (the **CONTINUE** and **PRINT FONTS** keys can also be used). The 04 portion of the message will then flash and the printer will return to on-line status when the page buffer is cleared (up to six additional pages may print).

Note



A reset is performed before and after the font printout and the self test. This reset first prints any buffered data, then clears all temporary fonts and temporary macros.

Form Feed Key:

FORM FEED

Pressing the **FORM FEED** key while the printer is off line and in a ready state tells the printer to print the contents of the page buffer. If the last page sent to the printer from the host is a partial page and the software does not send a command to print this data, use the **FORM FEED** key to print the partial page. If there is no data in the page buffer (i.e., the FORM FEED indicator is OFF), pressing this key will have no effect.

Menu Key:

The **MENU** key is used to access both the Printing Menu and the Configuration Menu (see Section 3-4). Printing Menu items can be overridden through software applications.

MENU

Briefly pressing the **MENU** key enters the Printing Menu. COPIES= is displayed. Once the menu is entered, pressing the **MENU** key will step through the menu items. The **+** and **-** keys are used to display choices (see the **+** and **-** keys below), and pressing the **ENTER/RESET MENU** key will save a selected menu item.

Holding down the **MENU** key until SYM SET= (HP 33440) or AUTO CONT= (HP 33449) is displayed (about 5 seconds) enters the Configuration Menu. Once the menu is entered, pressing the **MENU** key will step through the menu items. The **+** and **-** keys are used to display choices (see the **+** and **-** keys below), and pressing the **ENTER/RESET MENU** key will save a selected menu item.

Enter/Reset Menu Key:

The **ENTER/RESET MENU** key has two modes:

ENTER

Pressing the **ENTER/RESET MENU** key saves a menu selection. An asterisk (*) will appear beside the item to indicate it is saved. When these new settings take effect is dependent on which printer is being used.

HP 33440 only:

New settings will not take effect until an 07 RESET is performed or an E_CE is sent from the host.

HP 33449 only:

A new Printing Menu feature, **Auto Reset**, is performed if the printer determines that no buffered data and no temporary soft fonts or temporary macros are currently present. If buffered data, temporary fonts, or temporary macros are present and a new Printing Menu item is selected, the display will show 10 RESET TO SAVE when the printer is returned to on-line status. New settings will not take effect until an 07 RESET is performed or an E_CE is sent from the host. Pressing and holding the **RESET** key until 07 RESET appears will invoke the new *Printing Menu* settings but *buffered data* and temporary soft fonts and temporary macros will be lost. Pressing the **ON LINE** or **CONTINUE** key will save the *data* but the *Printing Menu* items will not be in effect. (The display will show the selected change but the current printer settings are not changed.)

RESET MENU

Holding down the **RESET MENU** key at least two seconds until 09 MENU RESET is displayed returns Printing Menu settings to factory default settings and puts these settings in effect. It also clears temporary soft fonts, temporary macros, and any stored page data.

Plus and Minus Keys:

+ and **-**

Once the desired menu item has been reached, these keys step through the available choices. For example, if the display window shows COPIES = 03 (HP 33449: COPIES = 3), pressing the **+** key will change the message to COPIES = 04 (HP 33449: COPIES = 4). Pressing the **-** key will change the message to COPIES = 03 (HP 33449: COPIES = 3) again. Holding down either of these keys will scroll through the available choices for each menu item.

Default Settings and Restart Routines

Default Settings

Default printer settings are defined as those settings which will be used as a result of performing a Control Panel 07 RESET or issuing a software reset ($E_C E$) from the host system. The printers originally ship with factory default settings as specified in Table 3-1. The factory default menu settings will remain in effect until altered using the Control Panel menu selection.

Note that all default Printing Menu settings can be overridden using software commands and will remain in effect until a subsequent printer reset (an $E_C E$ or Control Panel 07 RESET) is performed. These software commands do not alter the menu settings. Note also that software commands cannot override Configuration Menu settings.

Factory Default Settings

Factory defaults are permanently stored in the printer's ROM memory and can be used to set Printing and Configuration Menu settings in NVRAM. The printer will use these default settings until they are changed using the Control Panel or overridden by sending printer commands through software. Both Printing and Configuration Menu settings can be returned to factory default settings using the COLD RESET routine. Performing the RESET MENU routine will reset all Printing Menu settings to their factory defaults. Factory default settings for both printers are shown in Table 3-1.

Table 3-1. Factory Default Settings

Item (Display)	HP 33440	HP 33449
Number of Copies (COPIES=)	01	1
Font Source (FONT SOURCE=)	I (Internal)	I (Internal)
Font Number (FONT NUMBER=)	0	0
Pitch (PITCH=) or Point Size (PT. SIZE=)	n/a	PITCH 10.00 ¹ or POINT SIZE 12.00 ²
Paper Size (PAPER=)	n/a	LETTER/A4 ³
Orientation (ORIENTATION=)	n/a	PORTRAIT
Form (lines/page) (FORM=)	60	60/64 ³
Manual Feed (MANUAL FEED=)	OFF	OFF
Symbol Set (SYM SET=)	ROMAN-8	ROMAN-8
Auto Continue (AUTO CONT=)	OFF	OFF
I/O (I/O=)	SERIAL	PARALLEL
Serial (SERIAL=) ⁴	n/a	RS-232
Baud Rate (BAUD RATE=) ⁴	9600	9600
Robust XON (ROBUST XON=) ⁴	ON	ON

Table 3-1. Factory Default Settings (continued)

Item (Display)	HP 33440	HP 33449
DTR Polarity (DTR POLARITY=) ⁵	HI	HI
RET (RET=)	n/a	DARK
Page Protect (PAGEPROTECT=) ⁶	n/a	OFF
Display Language (LANGUAGE=) ⁷	n/a	ENG (English)
Envelope Tray ⁸	ENVELOP=COM10	PE TRAY=COM10/DL ³
<ol style="list-style-type: none"> 1. Only displayed when a scalable, fixed-spaced font is selected. 2. Only displayed when a scalable, proportional-spaced font is selected. 3. Factory-set with HP 33449AB (220 V). 4. Only displayed if SERIAL is selected as the I/O interface. 5. Only displayed if SERIAL and RS-232 are selected. 6. Only available with added memory. 7. Refer to Appendix B for configuration instructions. 8. Only displayed when the Envelope Tray is inserted. 		

Envelope Cassette Size Setting

Whenever an envelope tray is inserted in the printer, the Control Panel will display ENVELOPE= (HP 33440) or PE TRAY= (HP 33449). The envelope tray was designed for a variety of envelope sizes and the Control Panel setting establishes the printable area for four common sizes. These are MONARCH, C5, DL, or COM10. The first time an envelope tray is inserted in the printer, this message will read ENVELOPE=COM10* or PE TRAY=COM10* (the asterisk indicates the current default choice). If an envelope size different from COM10 is being used, the **+** and **-** keys should be used to display the available choices. When the **ENTER** key is used to make the desired selection, this choice becomes the new default value. This means that, when an envelope tray is inserted in the printer, the display will read from that time forward: ENVELOPE/PE TRAY=[selected choice]*.

For the **HP 33449 only**, note that if an alternate selection is not made within 10 seconds after inserting the envelope tray, the printer will return to an on-line condition using COM10 (or other previously selected envelope size setting) as its expected envelope size. To alter this setting, the envelope tray should be removed and reinstalled, and the selection procedure repeated within 10 seconds of reinstallation. In contrast, the **HP 33440** printer will remain in an off-line condition until explicitly placed on line by the user after insertion of an envelope tray.

Keep in mind that this setting is completely independent of any Printing Menu item selection. This means that, for example, although the paper/envelope size in the Printing Menu of the HP 33449 may have been changed to ENVELOPE=C5, insertion of an envelope tray will yield the same PE TRAY=[envelope size] message, where the displayed envelope size may not necessarily be C5. If C5 envelopes are indeed loaded in the envelope tray, the user must notify the printer of this fact at the time the tray is installed. Once selected, however, each subsequent time the envelope tray is installed, PE TRAY=C5* (in our example) will be displayed as the new default value.

For both printers, once set, the envelope tray size setting will not be altered by any other procedure than the one just discussed. Not even a COLD RESET routine will modify this setting.

Resetting the Printer

The printer can be reset in three different ways:

- Pressing the **CONTINUE/RESET** key until 07 RESET is displayed or sending an E_C E resets the printer to the values the user has selected through the Printing Menu.
- Pressing the **ENTER/RESET MENU** key until 09 MENU RESET is displayed resets the printer and all Printing Menu items to the factory default settings.
- Performing a COLD RESET (or “Cold Start”) operation resets the printer and menu items to factory default Printing and Configuration Menu settings. (See “Cold Reset Routine.”)

Most software automatically sends the E_C E command (the RESET command) before and after each job. With some software packages, this command may need to be sent by the user from the computer or a Control Panel RESET routine may need to be performed before sending a new job to the printer. Resetting the printer ensures that the Printing Menu settings from the Control Panel are used. If these settings are changed often or if printer commands that affect page format are sent, the printer may need to be reset to make sure that the desired settings are in use. (Note: any temporary fonts and temporary macros are also cleared when resetting the printer.)

Ordinarily, software will perform any necessary printer reset for the user. **Note that a Control Panel reset will clear (rather than print) any buffered data in the printer's memory.**

Reset Menu Routine

Holding down the **RESET MENU** key at least two seconds until 09 MENU RESET is displayed returns Printing Menu settings to factory default settings and puts these settings in effect. It also clears temporary soft fonts, temporary macros, and any stored page data.

Cold Reset Routine

A “COLD RESET” returns all Printing Menu and I/O Configuration Menu items to their factory default settings. “COLD RESET” does not reset the page count or envelope cassette size (or, for the HP 33449, display language) settings which are also stored in non-volatile RAM. A “COLD RESET” is performed by holding down the **ON LINE** key while powering on the printer. 08 COLD RESET (not localized for HP 33449) is displayed for one second, followed by the power-on SELF TEST message. The actual “COLD RESET” is performed immediately after the display shows 00 READY, and, afterward, the printer must be put on line by the user. Since I/O configuration values have been reset to factory defaults, proper settings should be verified before placing the printer on line.

3-4. USING THE PRINTING AND CONFIGURATION MENUS

Overview

Since the HP 33440 and HP 33449 Printing and Configuration Menus are quite similar, they have been combined, using the HP 33440 as the basis for discussion, with HP 33449 information added where there is a substantial difference. All HP 33449 messages for Printing and Configuration Menus are localized. (See Appendix F, "HP 33449 Display Language Message Translations.")

The **[MENU]** key accesses both the Printing and Configuration Menus. (The printer must be off line to access both menus.) Briefly pressing the **[MENU]** key enters the Printing Menu. Holding down the **[MENU]** key for several seconds enters the Configuration Menu.

- The Printing Menu contains printing items which determine the final appearance of the printed page, such as the number of copies, lines-per-inch, or font selection.
- The Configuration Menu contains printer configuration settings such as communication parameters, Resolution Enhancement levels, and memory configuration.
- Pressing the **[+]** or **[-]** key allows the user to step through the menu item choices; holding down the key scrolls quickly through menu item choices. Once the desired selection appears, it can be saved by pressing the **[ENTER]** key. An asterisk (*) will appear next to the item to indicate it has been selected.
- Press **[ON LINE]** at any time to exit a menu and return the printer to the on-line state.

Printing Menu Settings

The Printing Menu for both the HP 33440 and HP 33449 includes the following items:

- Number of copies.
- Manual feed selection.
- Font source.
- Font number.
- Lines-per-page.

The Printing Menu for the HP 33449 includes these additional items:

- Pitch (scalable, fixed-spaced fonts only).
- Point Size (scalable, proportionally spaced fonts only).
- Paper (or envelope) size.
- Print Orientation.
- Symbol Set (in Configuration Menu for HP 33440).

To enter the Printing Menu, briefly press the **[MENU]** key; **COPIES=** will be displayed. Table 3-2 (combined HP 33440 and HP 33449 Printing Menu items) and Table 3-3 (HP 33449 additional Printing Menu items) can be used as quick reference guides for using the Printing Menu. These tables describe printer Control Panel keys used to select Printing Menu items (the "Printer Displays" column shows the factory default settings).

Note



For the HP 33440 only, if a Printing Menu selection is made and the software does not perform a reset by sending an E_C E, then the printer must be reset using the RESET key on the Control Panel in order for the selection to take effect. The HP 33449 accomplishes this with the AUTO RESET feature.

Table 3-2. HP 33440 and HP 33449 Printing Menu Items

Items	Printer Displays	Press	Choices	Press
Copies	HP 33440: COPIES=01* ¹ HP 33449: COPIES=1*	<input type="button" value="+"/> or <input type="button" value="-"/> to	01 ... 99 1 ... 99	<input type="button" value="ENTER"/> to save selection or <input type="button" value="ON LINE"/> to exit menu or <input type="button" value="MENU"/> to continue
Manual Feed	MANUAL FEED=OFF*		ON or OFF	
Font Source	FONT SOURCE=I*	step or scroll through	I-Internal Fonts L-Left Cartridge R-Right Cartridge S-Soft Fonts	<input type="button" value="MENU"/> to continue
Font Number	HP 33440: FONT NUMBER=00* HP 33449: FONT NUMBER=0*	items	00 ... 99 0 ... 999	
Form Length	HP 33440: FORM=060 LINES* HP 33449: FORM=60 LINES* ²		005 ... 128 5 ... 128	

1. An asterisk (*) following an item indicates that the selection is saved.
2. FORM=64 LINES with HP 33449AB printers as shipped (220 V).

Table 3-3. HP 33449 Additional Printing Menu Items

Items	Printer Displays	Press	Choices	Press
Pitch ² or Pt. Size ³	PITCH=10.00* ¹ or PT. SIZE=12.00*	<input type="button" value="+"/> or <input type="button" value="-"/> to step or scroll through	0.44 ... 99.99 or 4.00 ... 999.75	<input type="button" value="ENTER"/> to save selection, <input type="button" value="ON LINE"/> to exit or <input type="button" value="MENU"/> to continue
Media Size	PAPER=LETTER* ⁴		LETTER (or LEGAL, A4, EXEC) ENVELOPE=COM10 (or MONARC, C5, or DL)	
Orientation	ORIENTATION=P*	through	L or P	<input type="button" value="MENU"/> to continue
Symbol Set ⁵	SYM SET=ROMAN-8* (HP 33449 only)	items	See Table 3-7	

1. An asterisk (*) following an item indicates that the selection is saved.
2. Selectable for a scalable, fixed-pitch font only.
3. Selectable for a scalable, proportional-pitch font only.
4. PAPER=A4 with HP 33449AB printers as shipped (220 V).
5. Symbol Set is in the Configuration Menu for the HP 33440.

Configuration Menu Settings

The Configuration Menu for both printers includes the following items:

- Symbol Set (HP 33440 only).
- Auto Continue.
- Interface Parameters.

The HP 33449 Configuration Menu includes the following additional items and omits Symbol Set, which is in the Printing Menu:

- Resolution Enhancement.
- Page Protection.

The Configuration Menu is used to program the printer for communication with a specific computer. To enter the Configuration Menu, press the **(MENU)** key until:

HP 33440: SYMBOL SET= appears in the display (about 5 seconds).

HP 33449: AUTO CONT= appears in the display (about 5 seconds).






Table 3-4 (combined HP 33440 and HP 33449 Configuration Menu items) and Table 3-5 (HP 33449 additional Configuration Menu items) can be used as quick reference guides to Configuration Menu items. They describe menu items used primarily during initial setup and configuration. (The "Printer Displays" column shows the factory default settings.)

Table 3-4. HP 33440 and HP 33449 Configuration Menu Items

Items	Printer Displays	Press	Choices	Press
Symbol Set ¹	SYM SET=ROMAN-8* ² (HP 33440 only)	(+) or (-) to step or scroll through items	See Table 3-6	(ENTER) to save selection or (ON LINE) to exit or (MENU) to continue
Auto Continue	AUTO CONT=OFF*		ON or OFF	
Interface	HP 33440: I/O=SERIAL* HP 33449: I/O=PARALLEL*		SERIAL or PARALLEL (or OPTIONAL) ⁵	
Interface Type	SERIAL=RS-232* ³ (HP 33449 only)		RS-232 or RS-422	
Baud Rate	BAUD RATE=9600* ³		300, 600, 1200, 2400, 4800, 9600, 19200	
XON Disposition	ROBUST XON=ON* ³		ON or OFF	
DTR Polarity	DTR POLARITY=HI* ⁴		HI or LO	

1. Symbol Set is in Printing Menu for the HP 33449.
2. An asterisk (*) following an item indicates that the selection is saved.
3. Only if SERIAL is selected.
4. Only if SERIAL and RS-232 are selected.
5. Only if an optional I/O interface is installed.

Table 3-5. HP 33449 Additional Configuration Menu Items


Items	Printer Displays	Press	Choices	Press
Resolution Enhancement	RET=DARK* ¹	 or  to step	DARK, MEDIUM, LIGHT or OFF	 to save selection,
Page Protection	PAGEPROTECT=OFF* ²	or scroll through items	OFF, LTR, LGL, or A4	 to exit, or  to continue
<ol style="list-style-type: none"> 1. An asterisk (*) following an item indicates that the selection is saved. 2. Page Protection is available only when optional additional memory is installed. 				

Symbol Sets

A symbol set is usually selected during initial printer configuration. If a new default symbol set is selected from the appropriate menu, it will cause the font selection menu item to revert to FONT NUMBER=0. This is done because the printer places all fonts in the selected symbol set at the top of its font list and reassigns font numbers. If, after specifying a new default symbol set, font 0 is not the desired default font, a new Print Fonts routine should be performed and a new default font selected from the resulting printout (see Section 3-5 for more information regarding Print Fonts).

With ROMAN-8 selected as the default symbol set, the symbol sets in Table 3-6 are arranged in sequence as they are displayed on the HP 33440. The symbol sets in Table 3-7 which follows are arranged in sequence as they are displayed on the HP 33449.

Auto Continue

When AUTO CONTINUE is set to ON, recoverable errors will take the printer off line and display the message for 10 seconds before the printer will resume printing. When it is set to OFF, the printer will wait for the  key to be pressed before printing will resume. It is recommended that AUTO CONTINUE be set to OFF so that any recoverable error messages show until they are corrected. **Note:** If your printer is part of a network, remote, or spooling system, AUTO CONT=ON is the recommended setting.

Interface Type

The type of serial interface (RS-422 or RS-232) is selected from the Control Panel on the HP 33449. To configure the HP 33440 for RS-422 communications, refer to Section 3-2.

Resolution Enhancement (HP 33449 Only)

Resolution Enhancement (RET) refines the print quality of characters and graphics by “smoothing” the fine gradations along the edge of the printed image. The RET option has four choices: dark, medium, light, and off. The factory default setting is DARK.

Caution



Some optional interface boards from vendors other than Hewlett-Packard are not compatible with Resolution Enhancement. Examples are the Intel^R *Visual Edge* and the OP-Tek *LaserPort* and *LaserPort GrayScale*. When using one of these products, set RET=OFF.

Table 3-6. HP 33440 Symbol Sets in Sequence

Set #	Display	Symbol Set	Set #	Display	Symbol Set
8U	ROMAN-8	Roman-8	2S	ISO 17	Spanish
0N	ECMA-94	ECMA-94 Latin 1	1G	ISO 21	German
10U	IBM-US	PC-8	0F	ISO 25	French
11U	IBM-DN	PC-8 Denmark/Norway	2K	ISO 57	Chinese
2U	ISO 2	Int'l Ref. Version	0D	ISO 60	Danish\Norwegian
1E	ISO 4	United Kingdom	1D	ISO 61	Norwegian v2
0U	ISO 6	ASCII	IF	ISO 69	French
3S	ISO 10	Swedish	5S	ISO 84	Portuguese: IBM
0S	ISO 11	Swedish	6S	ISO 85	Spanish: IBM
0K	ISO 14	JIS ASCII	0G	German	HP German
0I	ISO 15	Italian	1S	Spanish	HP Spanish
4S	ISO 16	Portuguese			

Table 3-7. HP 33449 Symbol Sets in Sequence

Set #	Display	Symbol Set	Set #	Display	Symbol Set
8U	ROMAN-8	Roman-8	0D	ISO 60	Danish/Norwegian
0N	EC94 L1	ECMA-94 Latin 1	1D	ISO 61	Norwegian v2
10U	PC-8	PC-8	IF	ISO 69	French
11U	PC-8 DN	PC-8 D/N	5S	ISO 84	Portuguese
12U	PC-850	PC-850	6S	ISO 85	Spanish
1U	LEGAL	Legal	0G	German	HP German
2U	ISO 2	Int'l Ref. Version	1S	Spanish	HP Spanish
1E	ISO 4	United Kingdom	6M	VN MATH	Ventura Math
0U	ISO 6	ASCII	13J	VN INTL	Ventura International
3S	ISO 10	Swedish	14J	VN US	Ventura US
0S	ISO 11	Swedish	5M	PS MATH	PS Math
0K	ISO 14	JIS ASCII	10J	PS TEXT	PS Text
0I	ISO 15	Italian	8M	MATH-8	Math-8
4S	ISO 16	Portuguese	15U	PI FONT	Pi Font
2S	ISO 17	Spanish	6J	MS PUBL	Microsoft Publishing
1G	ISO 21	German	9U	WINDOWS	Windows
0F	ISO 25	French	7J	DESKTOP	DeskTop
2K	ISO 57	Chinese			

Note

Changing the Control Panel symbol set affects the order in which fonts are listed on the font printout. It also affects the Control Panel default font.

Print Density and Resolution Enhancement

The print density adjustment (see Chapter 4, Section 4-9) setting interacts with *Resolution Enhancement*. For any resolution enhancement level, adjusting the print density may place too much or too little toner at the transition points along gradually sloping lines. A slight bulging or pinching effect may be seen if the lines are examined closely. The following drawings illustrate how the line transitions appear with different amounts of toner:

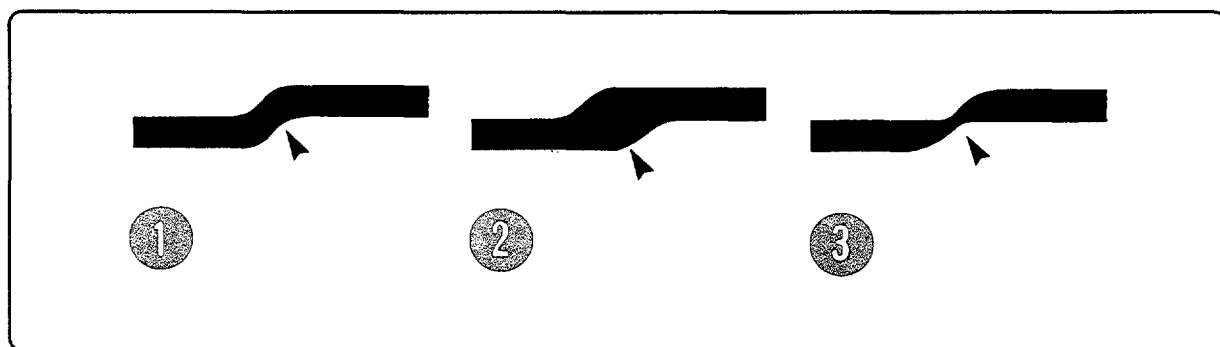


Figure 3-3. Print Density at Line Transitions

1. Normal line transition.
2. Too much toner; set RET in the Control Panel Configuration Menu to a lighter setting.
3. Too little toner; set RET in the Control Panel Configuration Menu to a darker setting.

Check the adjustment by examining a self-test printout (see Figure 3-4 for an enlarged portion of the printout). Look at the 33% slice in the pie chart. If light vertical stripes appear (see left side), try setting RET to the next darker setting. If dark vertical stripes appear, try setting RET to the next lighter setting. If the output still has dark vertical stripes (see right side), adjust the print density dial to a slightly lighter setting (a higher number on the print density dial) and repeat the adjustment.

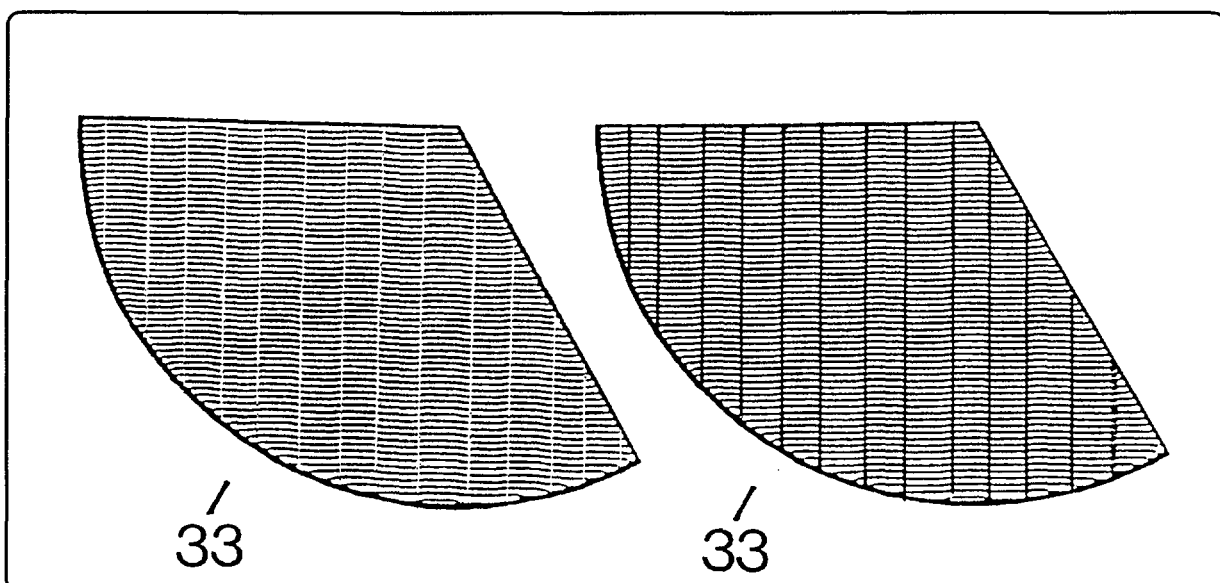


Figure 3-4. Vertical Stripes in the 33% Pie Slice

Page Protection (HP 33449 Only)

For Page Protection to appear as a Configuration Menu option, *at least 1 Mbyte of optional memory must be installed.*

A page's complexity (rules, vector graphics, or dense text) may exceed the printer's ability to create an image and keep pace with the engine printing process. If a page is too complex, the page might print in parts or only part of the page might print. In such cases, a 21 PRINT OVERRUN message (signifying possible loss of print data) will appear in the display.

Page Protection reserves additional memory for the page image process, allowing the printer to create the entire page image (in memory) before physically moving the paper through the printer. This ensures that the entire page will be printed. Page Protection can be set for LTR (letter), A4, or LGL (legal) size pages.

Page Protection reconfigures the printer's memory each time the page protection level is changed. For example, when Page Protection is enabled for letter-sized paper ("LTR"), 1040 Kbytes of memory is reserved for the "image memory," which is memory dedicated for page-image definition. When Page Protection is disabled (i.e., "OFF"), however, 848 Kbytes is released to user memory and 191 Kbytes is retained for the image memory.

With a 1 Mbyte memory board installed, user memory consists of 720 Kbytes of internal (the memory that comes with the printer) user-available memory and the 1024 Kbytes of added memory—a total of 1,744 Kbytes. Table 3-8 illustrates the available memory for various configurations:

Table 3-8.
Page Protection Memory Configurations
(With 1 Mbyte of additional memory)

Status	User Memory	Image Memory
OFF	1,744 Kbytes	191 Kbytes
LTR/A4	896 Kbytes	1,040 Kbytes
LGL	702 Kbytes	1,234 Kbytes

When the **ENTER** key is pressed, 17 MEMORY CONFIG will briefly appear in the display, indicating that the memory is being reconfigured for (or from) Page Protection. The printer then performs an internal self test and automatically returns on line. When all optional memory is removed from the printer, Page Protection is automatically set to OFF.

Note



The printer erases all downloaded fonts (including permanent fonts) and all macros (including permanent macros) and any page data when memory is reconfigured for Page Protection.

3-5. FONT PRINTOUTS

Understanding the Font Printout

Font printouts for the HP 33440 and HP 33449 are different although the printout procedure is basically the same:

1. Take the printer off line, then briefly press the **PRINT FONTS/TEST** key.
2. The message, 06 FONT PRINTOUT, will appear and several pages will be printed. (HP 33449 only: thirty seconds may elapse between pages to allow time for the generation of any scalable characters.)

HP 33440:

The HP 33440 printout displays six columns of information: numbered items below refer to Figure 3-5:

1. **Font ID** is the number the printer uses to select internal fonts, cartridge fonts, or downloadable soft fonts from the Control Panel. (Note: this is *not* a soft font ID number used by software.) The letter preceding the font number indicates the location of the font.

S = Permanent soft font, residing in printer memory.
R = Fonts in the right font cartridge.
L = Fonts in the left font cartridge.
I = Internal printer fonts.
2. **Name** is the name of the typeface (e.g., COURIER).
3. **Pitch** shows the characters-per-inch of a fixed pitch font or "PS" for proportionally spaced fonts.
4. **Point Size** refers to the character's height (72 points per inch, 28.3 per centimeter).
5. **Symbol Set** refers to the specific collection of characters and symbols associated with a font (see Table 3-6).
6. **Print Sample** shows what the font characters look like.

----- PORTRAIT FONTS -----

POINT ID	NAME	PITCH	SIZE	SYMBOL SET	PRINT SAMPLE
<u>"PERMANENT" SOFT FONTS</u>					
S01	CG CentSchl	PS	10	7J	ABCDEFghij#\$@[\\`{ }~123 ¡§%•◻◻◻

Figure 3-5.
HP 33440 Font Printout
(In English only)

HP 33449:

The HP 33449 printout displays 11 columns of information in the localized language. Numbered items below refer to Figure 3-6:

1. **Font #** is the number the printer uses to select internal fonts, cartridge fonts, or downloadable soft fonts from the Control Panel. (Note: this is *not* a soft font ID number used by software.) The letter preceding the font number indicates the location of the font.

S = Permanent soft font, residing in printer memory.
 R = Fonts in the right font cartridge.
 L = Fonts in the left font cartridge.
 I = Internal printer fonts.

Note For the HP 33440, **Font ID** is the equivalent of **Font #** for the HP 33449.



-
2. **Font ID** is an ID number assigned only to permanent soft fonts downloaded from the host system and selected by software.
 3. **Symbol Set** refers to the specific collection of characters and symbols associated with a font. Internal and cartridge scalable fonts will only be shown in the symbol set selected on the Control Panel. (See Table 3-7).
 4. **Fix/PS** indicates whether the font has fixed or proportional spacing (F or P).
 5. **Pitch (cpi)** shows the characters-per-inch of a fixed pitch font. (If the font is a scalable, fixed-spaced font, "Scale" will appear in this column.)
 6. **Point Size** refers to the character's height (72 points per inch, 28.3 per centimeter). (If the font is a scalable, proportional-spaced font, "Scale" will appear in this column.)
 7. **Style** indicates whether the font is upright or italic.
 8. **Stroke Weight** is a font treatment such as medium, bold, light, or black.
 9. **Name or Typeface** is the name of the typeface.
 10. **Default Orient** indicates whether the font defaults to either portrait or landscape orientation. (Note that the HP 33449 printer, unlike the HP 33440, can rotate fonts to the orientation selected by the software, even if the font is not resident in the printer in that orientation.) Fonts produced from scalable typefaces are only listed in the portrait orientation.
 11. **Print Sample and Escape Sequence.** *Print sample* shows what the characters look like. *Escape sequence* is an actual printer command sequence used to select the designated font.

Figure 3-6.
HP 33449 Font Printout
(Localized for selected language)

3-6. SELF TESTS

General

Three types of self-test routines, other than Service Mode tests covered in the next section, can be performed on the HP 33440 and HP 33449 printers. These self-test routines are:

- 05 SELF TEST.
- 04 SELF TEST.
- 15 ENGINE TEST (Test Print).

05 SELF TEST

Each time the printer is powered on or the Control Panel **PRINT FONTS/TEST** key is held down for 2-to-5 seconds, 05 SELF TEST is displayed. (If the key is held down longer, 04 SELF TEST will be displayed.) The printer will then execute a self test that verifies operation in the following areas:

- Program ROM.
- Internal Font ROM.
- RAM on the Interface/Formatter PCA and any optional (accessory) RAM PCAs.
- DRAM Controller.
- Interface/Formatter logic.
- All LEDs.

If the self test was explicitly invoked, valuable information about page count, date codes, and configuration selections can be obtained from the first portion of the resulting printout. The information is summarized in Figure 3-7 for the HP 33440 and in Figure 3-8 for the HP 33449. When the printer is first switched on, only the non-printing portion of the self test is performed. A self test must be requested from the Control Panel or through an E_CZ command to get a self-test printout. When the printing portion of the self test begins, the message 06 PRINTING TEST is displayed. The self test may be aborted by pressing the **ON LINE**, **CONTINUE/RESET**, or **PRINT FONTS/TEST** keys. The numeric portion of the message will flash while the self test is being aborted.

Note

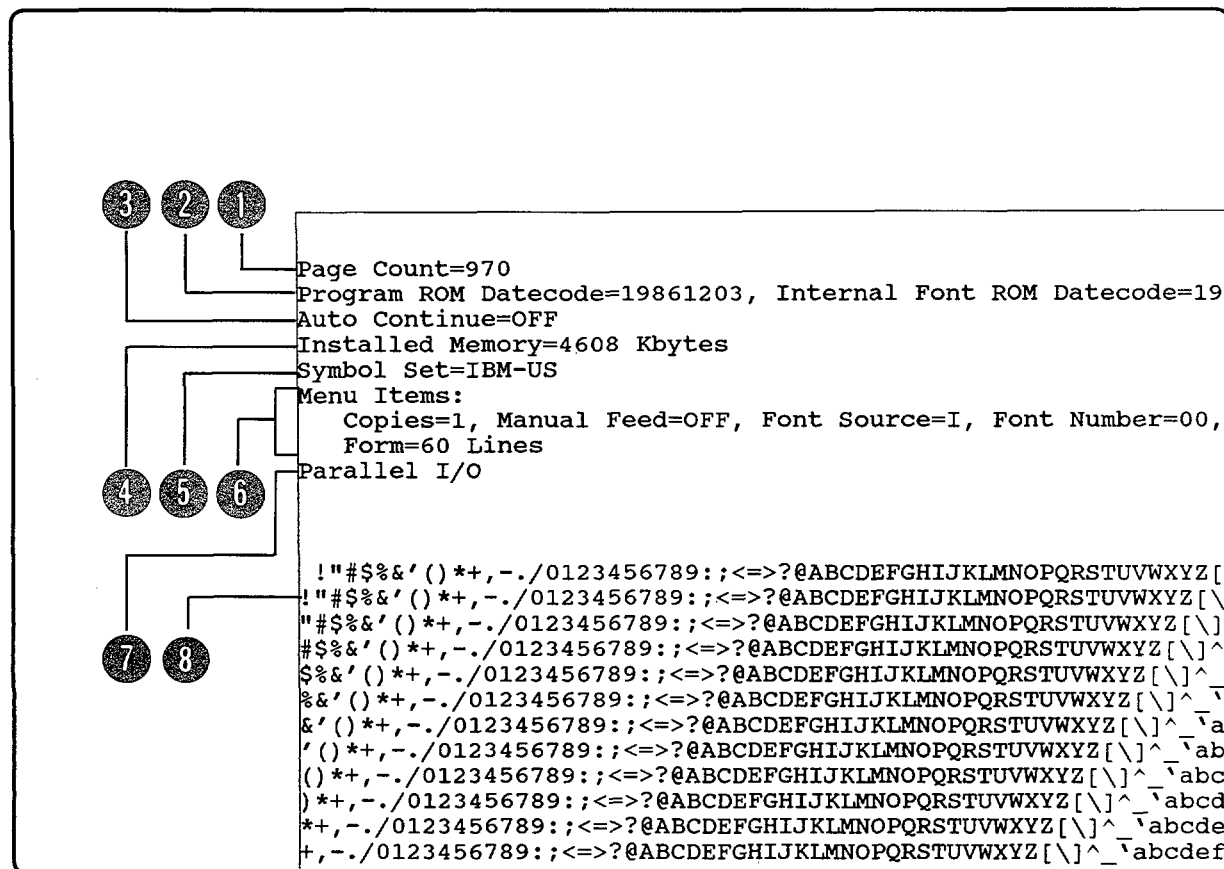


The self test is printed in the default media size in the default orientation. The HP 33440 self-test printout is an example of 12% print coverage (see Figure 3-7). The HP 33449 self-test printout is an example of 10% print coverage (see Figure 3-8). This may be useful as a reference in determining toner use. A typical EP-S Cartridge should have adequate toner to print 4000 sheets of paper at an average 5% coverage.

Self-Test Printout Information

The Self-Test Printout contains valuable information such as page count, firmware date codes, Control Panel settings, and any installed options.

1. **Page Count:** Shows approximately how many pages have been printed over the life of the printer. Page count can be used to determine when to change the ozone filter and to track printer usage. The page count is current as long as the printer is powered on. When the printer is powered off, the page count is rounded down to the nearest ten-page increment and recorded in non-volatile memory.
2. **Date Codes:** Shows Program ROM and Internal Font ROM date codes (YYYYMMDD).
3. **Auto Continue:** Shows Auto Continue setting.
4. **Installed Memory:** Shows total amount of available memory.
5. **Symbol Set:** Shows selected symbol set.
6. **Printing Menu:** Shows selected Printing Menu items.
7. **Configuration Menu:** Shows selected Configuration Menu items.
8. **Sample Print:** Shows ripple print pattern. This area is useful for checking print density and quality.



HP 33449 Self Test Printout

The numbered items below refer to Figure 3-8.

1. **Printing Menu:** Shows the current Printing Menu selections in the order that they appear in the Control Panel display. Use this information to verify that the selections are active in the Printing Menu.
2. **Configuration Menu:** Shows the current Configuration Menu selections in the order that they appear in the Control Panel display. Use this information to verify how the printer is set up to communicate with the computer.
3. **RAM Size:** Shows how much memory is installed in the printer. 1024 Kbytes of installed memory is standard with the printer. If optional memory boards have been installed, a self test can be used to verify that the boards are installed properly.
4. **Page Count:** Shows approximately how many pages have been printed over the life of the printer. Page count can be used to determine when to change the ozone filter and to track printer usage. The page count is current as long as the printer is powered on. When the printer is powered off, the page count is rounded down to the nearest ten-page increment and recorded in non-volatile memory.
5. **Date Codes and Installed Devices:** Shows firmware and internal font date codes (YYYYMMDD) as well as installation of cartridges and media tray size.
6. **Sample Print:** Shows ripple print pattern. The ripple print pattern (always in Courier for the HP 33449) and the areas at the top and bottom of the page are useful for checking print density and quality.
7. **Scalable Typefaces:** Demonstrates the printer's ability to print with scalable typefaces.
8. **Graph/Pie Chart:** The bar graph and pie chart test the printer's HP-GL/2 vector graphics capability. (The 33% portion of the pie chart also serves as a check on the Resolution Enhancement quality and proper adjustment—see Figure 3-4.)
9. **Patterns:** Use the shading and crosshatch patterns in the blocks at the top and bottom of the page as well as in the charts to check print density and quality.

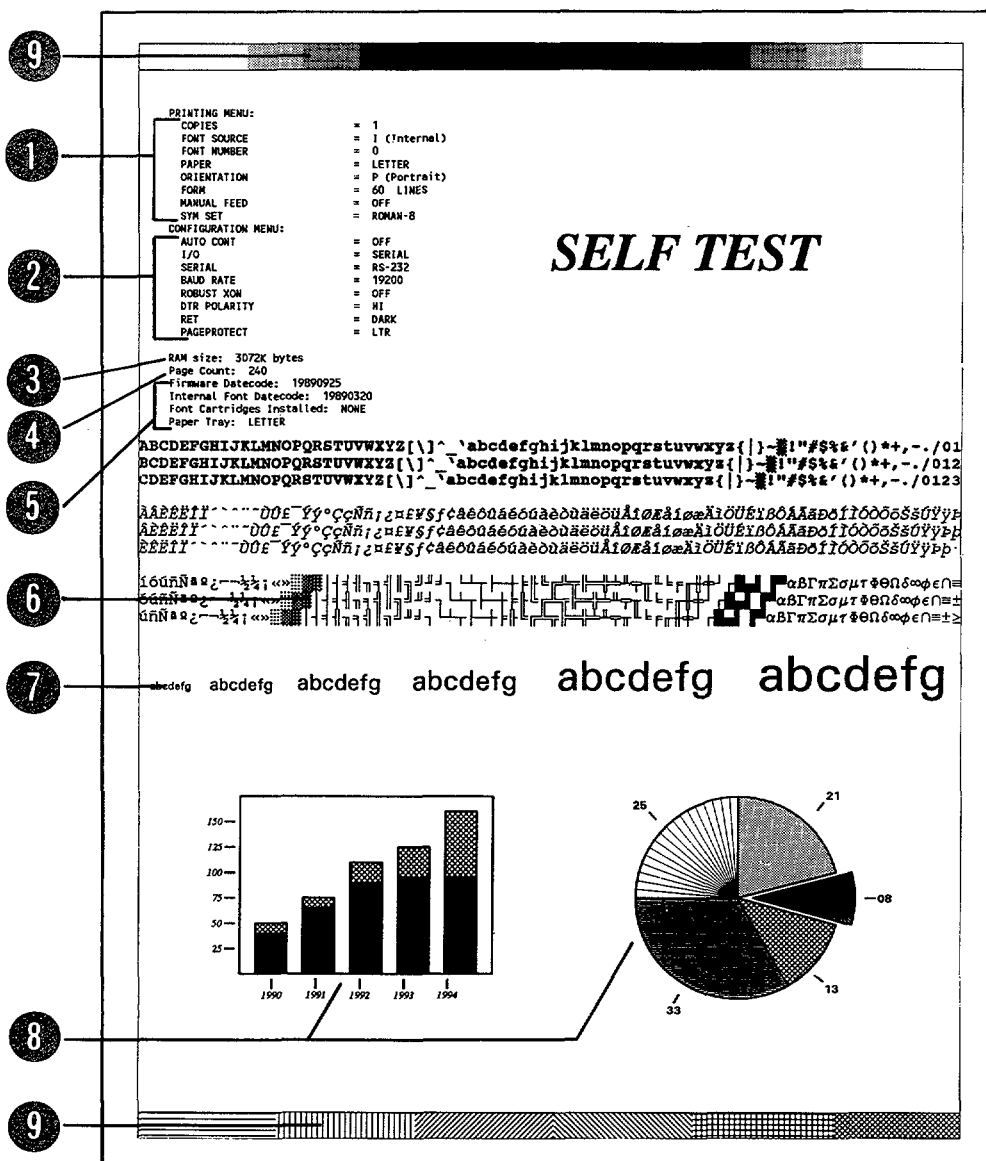


Figure 3-8. HP 33449 05 SELF TEST Printout

04 SELF TEST

Holding down the **PRINT FONTS/TEST** key until 04 SELF TEST is displayed (about 5 seconds) will cause a continuous self test to be run using the 05 SELF TEST printout page. The continuous self-test mode is a good way to test the paper path since it only tests the electronics once while continuing to print out the self-test page. Pressing the **PRINT FONTS/TEST**, **ON LINE**, or **CONTINUE/RESET** key terminates the continuous test mode. The numeric portion of the message will flash while the self test is being aborted.

Note



Because of the complex graphics on the Self-Test page, printing speed for the HP 33449 will be less than the full eight-page-per-minute rated level.

Test Print (15 ENGINE TEST)

Activating the TEST PRINT switch—accessed by inserting a pen or pencil into the hole on the lower right side of the printer (Figure 3-9) (behind a cover panel on the HP 33449)—causes a page of vertical lines (shown in Figure 3-10) to be printed. While printing, the display will read 15 ENGINE TEST. This is an engine test only since the Interface PCA is completely bypassed to produce this print. It is useful to verify proper operation of the DC Controller circuitry and all other print engine components (i.e., everything but the Interface/Formatter PCA). Holding down this button will produce continuous pages until the button is released.

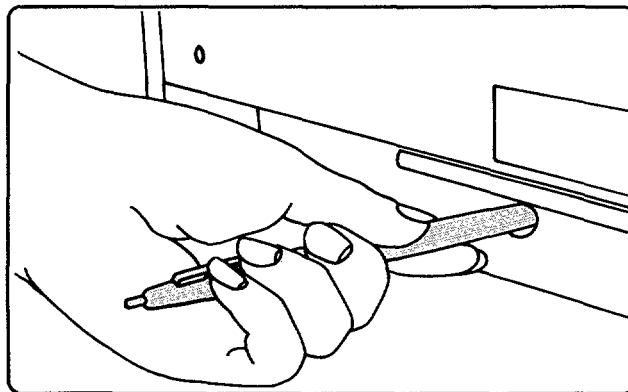


Figure 3-9. Selecting the Test Print Switch (HP 33440 shown here)

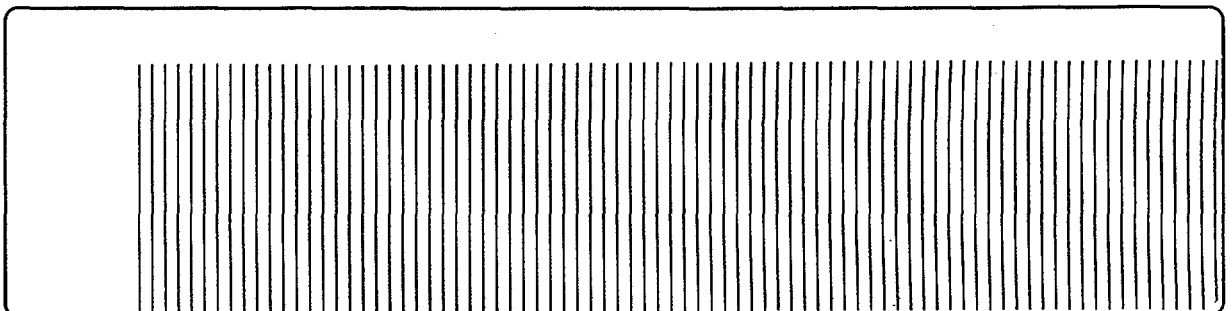


Figure 3-10. Portion of Test Print Pattern

3-7. SERVICE MODE

General

Service Mode should only be used by service representatives. It exists to allow the page count (which measures the life of the print engine) to be reset in the event the Interface PCA is replaced and to print a test pattern which is useful for print quality analysis.

Note For the HP 33449, Service Mode messages are not localized (except for certain messages, such as 05 SELF TEST, which are used in both user and Service Mode).



Using Service Mode

To access Service Mode:

1. Hold down the **ON LINE**, the **CONTINUE/RESET**, and the **ENTER/RESET MENU** keys simultaneously for at least one second while powering on the printer. This interrupts the normal initial non-printing self test. If Service Mode has been properly selected, the display will be blank and all four LEDs will be illuminated.
2. Press the **CONTINUE/RESET** key *once only*. Then press the **ENTER/RESET MENU** key.
3. The display will read SERVICE MODE (not localized) and all four LEDs on the Control Panel will still be illuminated.

Note Any attendance message, such as 16 TONER LOW, will override the SERVICE MODE display. However, the printer is in service mode at this time if the preceeding steps were performed.



4. Although the procedures are essentially the same, timing for the HP 33440 and HP 33449 differ at this point:

HP 33440: After from 5 to 30 seconds, depending upon installed memory, 05 SELF TEST will be displayed and all four lights on the Control Panel will turn off. After about five seconds, 02 WARMING UP will be briefly displayed, after which the printer will again display SERVICE MODE and the ready indicator (only) will illuminate.

HP 33449: After less than one second, 05 SELF TEST (not localized) will be displayed and all four lights on the Control Panel will remain lit for up to 60 seconds, depending upon installed memory, then turn off for about 10 seconds, after which the printer will again display SERVICE MODE and the ready indicator (only) will illuminate.

If the self test fails, the printer will display the same error message that it normally would.

5. To exit Service Mode for either printer, press either the **ON LINE** or the **CONTINUE** key. To return the HP 33440 on line, the **ON LINE** key must be pressed again.

Self Tests

Several self tests can be performed in Service Mode:

1. **HP 33449 only:** Press the **PRINT FONTS/TEST** key to perform the printing portion of the self test. 05 SELF TEST is displayed (localized for HP 33449) and a self-test printout is produced.
2. For both printers, holding down the **PRINT FONTS/TEST** key until 05 SELF TEST is displayed (about two seconds) causes the formatter to first perform a self test. During the printing portion, 06 PRINTING TEST (localized for HP 33449) is displayed and a Service Mode self-test printout is produced. The printer will then again display SERVICE MODE. Figure 3-11 shows a sample of the Service Mode self-test print.
3. The **PRINT FONTS/TEST** key can also be used to run continuous Service Mode self tests by holding down the key until 04 SELF TEST (localized for HP 33449) is displayed. After several seconds, the printer will begin continuously printing the Service Mode printout.
4. To abort the self test, press the **ON LINE** key once; this will return the printer to Service Mode. Several additional pages may be printed to clear the buffer, during which time the 04-portion of the message will flash.

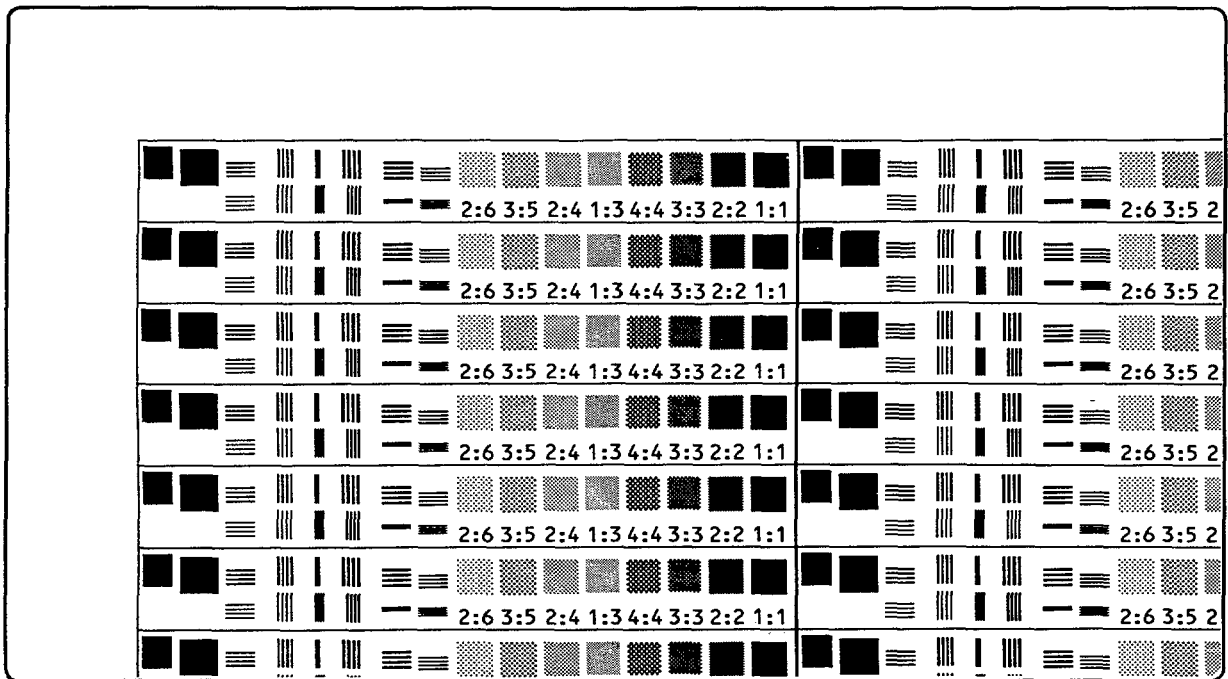


Figure 3-11. Portion of Service Mode Self Test

Note



The Service Mode Self Test is printed in either the portrait or landscape orientation, depending on the orientation setting established prior to entering Service Mode. It is also formatted to the default page size.

Setting the Page Count

The page count, which is stored in non-volatile RAM and displayed on the self-test printout, represents the number of pages which have been formatted by the printer. If it becomes necessary to install a new Interface PCA, the page count should be set to reflect the page count (age) of the print engine. To set the page count, enter Service Mode and perform the following procedure:

1. Before removing the old Interface PCA, verify the current page count of the printer. This can be done by executing a 05 SELF TEST (before entering Service Mode) or, for the HP 33449, by pressing the **PRINT FONTS/TEST** key while in Service Mode. The page count can be found on the first line of the printout for the HP 33440 and following the Configuration Menu setting for the HP 33449.

Note



If a 05 SELF TEST will not execute, the page count can be verified by entering Service Mode as described above. After entering Service Mode, perform the following steps:

- Press the **MENU** key.
- **PAGES=XXXXXX** is displayed. **XXXXXX** is the page count currently stored in NVRAM. The underlined character denotes the cursor position.
- Record this number for future reference in setting the page count after installing the new PCA.

2. After verifying the page count of the old Interface PCA, install the new PCA as described in Chapter 6.
3. To store the page count in the Non-Volatile RAM (NVRAM) on the new Interface PCA, perform the following steps:
 - After entering Service Mode, press the **MENU** key.
 - **PAGES=XXXXXX** is displayed. **XXXXXX** represents the digits for the page count currently stored in NVRAM. The underlined character denotes the cursor position.
 - Using the **(+)** or **(-)** keys, select the desired value for the underlined digit and press **ENTER**. The cursor will automatically move one digit to the right.
 - Set each digit in the same manner. When the final value has been entered, the printer will automatically return to Service Mode.

Note



The page count is accurate (current) as long as the printer is powered on. When the printer is switched off, the page count is rounded down to the nearest 10 increment and retained in NVRAM. This means that the page count number may be off by up to nine pages each time the printer is switched off.

PREVENTIVE MAINTENANCE

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4-1. INTRODUCTION

Very little routine operator maintenance is required for HP 33440 and HP 33449 printers. Most maintenance and adjustment procedures are carried out only when the EP-S Cartridge is changed or there is a print quality or paper feed problem. Since the maintainable parts of both printers are similar, the HP 33440 has generally been used for illustration.

Note



All routine maintenance and adjustments are the customer's responsibility. Most of the following procedures are included for reference only.

4-2. LIFE EXPECTANCY OF CONSUMABLES AND RELATED PARTS

The expected service life of consumables and related parts is given in Table 4-1. Always inspect these components for wear when servicing the printer. The expected-service-life estimates are based on A4 or letter size prints with an average of 5 percent toner coverage at a density dial setting of "7". The control panel self test printout produces approximately a 12 percent coverage for the HP 33440, 10 percent for the HP 33449.

Table 4-1. Service Life of Consumables

Description	Qty	Service Life (# of prints)	Remarks
EP-S Cartridge*	1	Approximately 4000 pages (application dependent). Open: 6-mo. shelf life. Unopened: 2-yr. shelf life.	Rocking the cartridge when TONER LOW appears may prolong cartridge life.
Cleaner Pad*	1	Life of EP-S Cartridge.	Included with EP-S Cartridge.
Fusing Assembly	1	100,000**	
Feed Roller Assembly	1	100,000** or anytime the Separation Pad is replaced.	
Separation Pad	1	100,000** or anytime Feed Roller Assembly is replaced.	
Ozone Filter***	1	50,000**	
Transfer Corona	1	100,000**	
*Customer responsibility. **Estimated, see note below. ***HP responsibility on early HP 33440s.			

Note



The 100,000-page component service life is ONLY AN ESTIMATE. The service life of consumables is directly related to the type of media used and the type of printing being done. The Fusing Assembly, Feed Roller Assembly, Separation Pad, and Transfer Corona Assembly should be inspected for excessive wear and replaced if necessary whenever a printer is being serviced.

4-3. MAINTENANCE CHECKPOINTS

Principal maintenance checkpoints for the HP 33440 and HP 33449 printers are illustrated in Figure 4-1 below. Since the printers are quite similar, the HP 33440 has been used for illustration here.

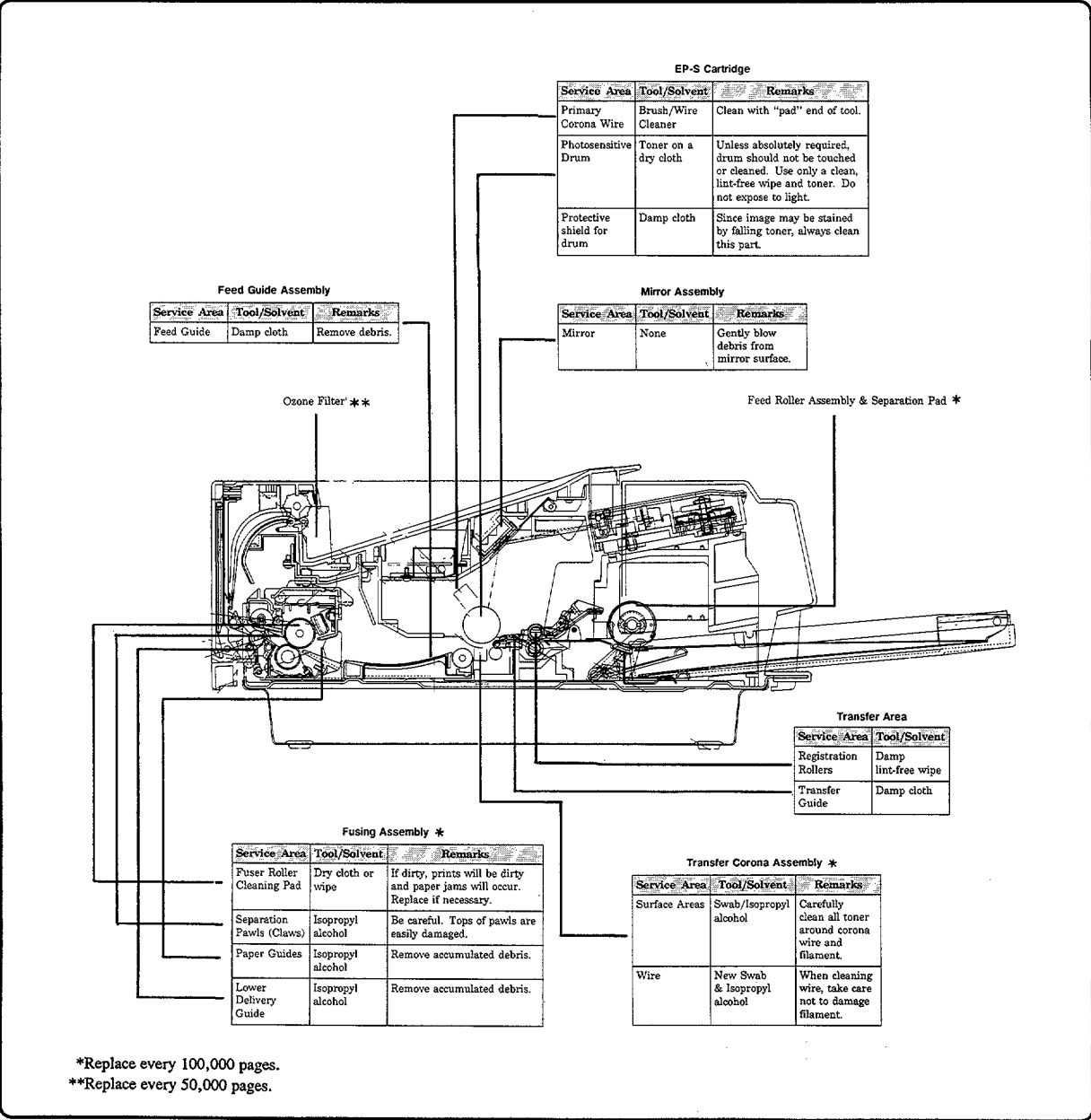


Figure 4-1. Maintenance Checkpoints

Caution



Do not clean with—or expose rubber rollers or other rubberized parts to— isopropyl alcohol. Do not use ammonia-based cleaning products or the EP-S Cartridge drum may be permanently damaged.

4-4. CLEANING THE PRINTER

General

If reduced print quality occurs, clean the inside of the printer by wiping any visible toner away with a damp cloth. Items that are colored green are user-accessible for cleaning.

Note



Toner is a nontoxic substance composed of plastic, iron, and a small amount of pigment. Care should be taken to avoid breathing toner particles. To clean toner from skin and clothing, remove as much toner as possible with a vacuum or dry tissue wipes, then wash the toner from skin or clothing with *cold* water. Hot water may make toner very difficult to remove. Because toner tends to be degraded by vinyl materials, contact with vinyl should be avoided.

There are seven primary areas of the printer which should be kept clean:

- | | |
|------------------------------|-------------------------|
| 1. Transfer Guide. | 5. Fusing Assembly. |
| 2. Transfer Corona Assembly. | 6. Beam-to-Drum Mirror. |
| 3. Registration Assembly. | 7. Primary Corona. |
| 4. Feed Guide Assembly. | |

Caution



The printer must be turned off prior to cleaning.

Transfer Guide

Wipe the Transfer Guide (silver strip, see Figure 4-2) clean with a damp cloth (use water only).

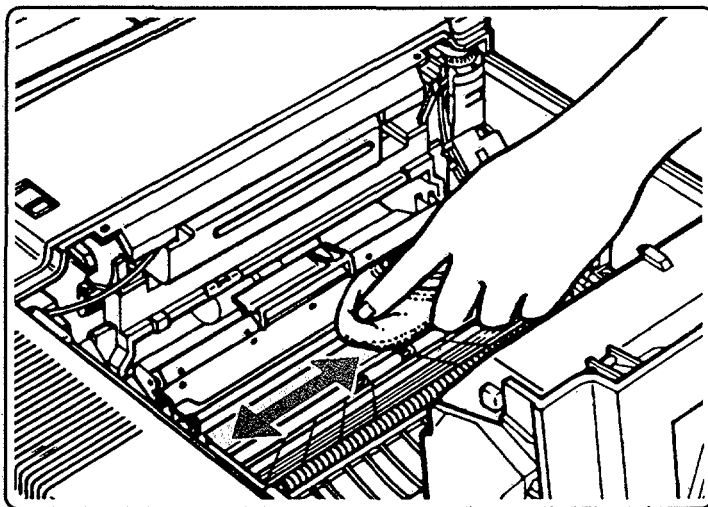


Figure 4-2. Cleaning the Transfer Guide

Transfer Corona Assembly

To clean the Transfer Corona Assembly:

1. Switch the printer OFF and open the Top Cover Assembly.
2. Dip a cotton swab in isopropyl alcohol. Water can be used if isopropyl alcohol is not available. Make sure the swab is not dripping.
3. Carefully clean the Transfer Corona housing, removing as much toner buildup as possible.
4. With a clean swab and isopropyl alcohol (or water), gently wipe the Transfer Corona wire (see Figure 4-3) with the cotton swab until no residue remains.
5. With the brush-end of the green cleaning brush, remove any debris accumulations around the sharp row of static teeth on the output side of the Transfer Corona (see Figure 4-3).

Caution



Be careful not to break the monofilament lines that cross diagonally above the Transfer Corona wire. Also, be careful not to get alcohol on any rollers or plastic parts.

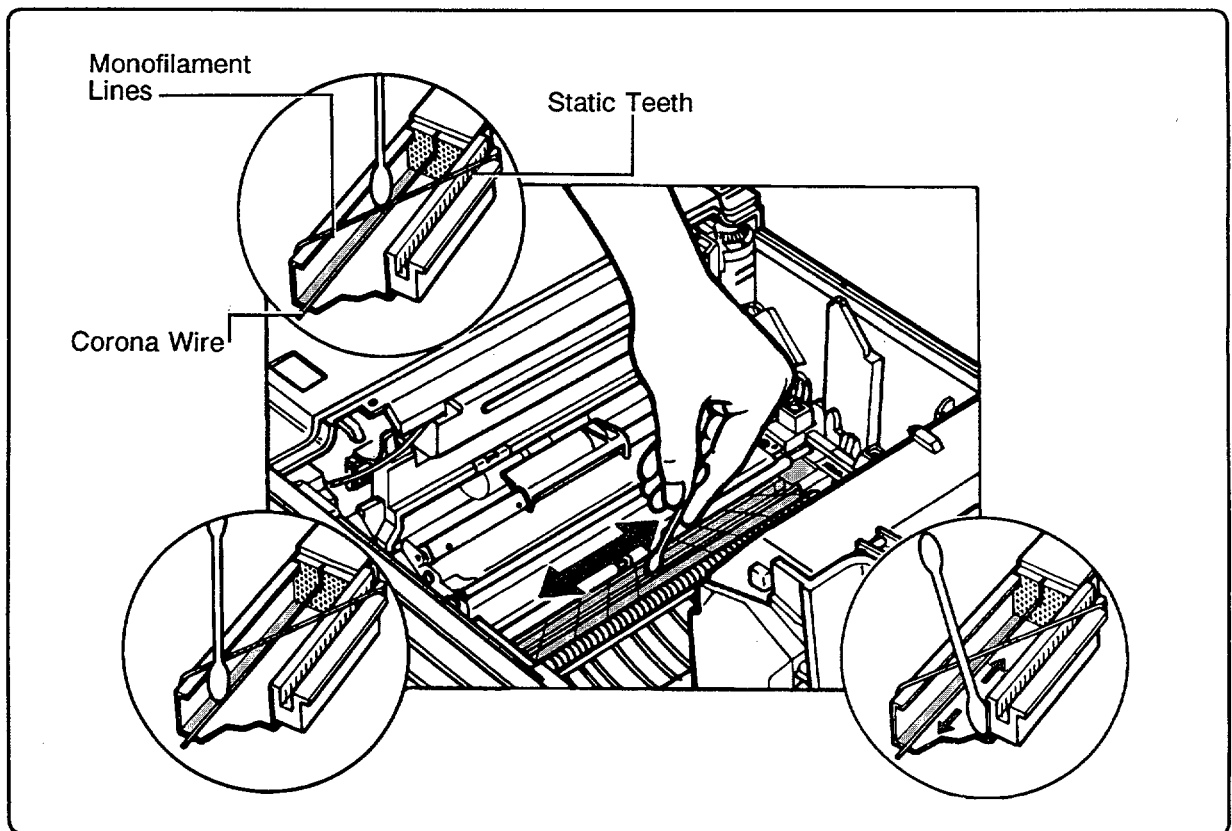


Figure 4-3. Cleaning the Transfer Corona Wire

Registration Assembly

Remove any debris from the Registration Assembly's cover. Lift the cover of the Registration Assembly (see Figure 4-4) and wipe off any paper dust underneath the assembly cover with a damp cloth (use water only).

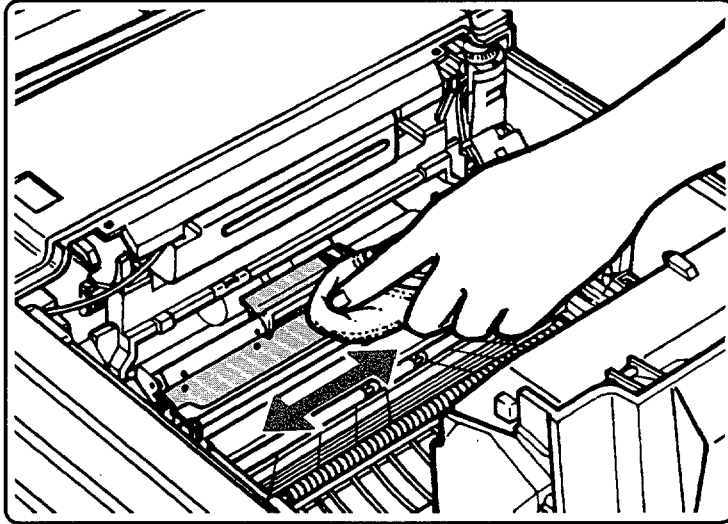


Figure 4-4. Cleaning the Registration Assembly

Feed Guide Assembly

Wipe the Feed Guide Assembly (see Figure 4-5) with a dampened cloth (use water only).

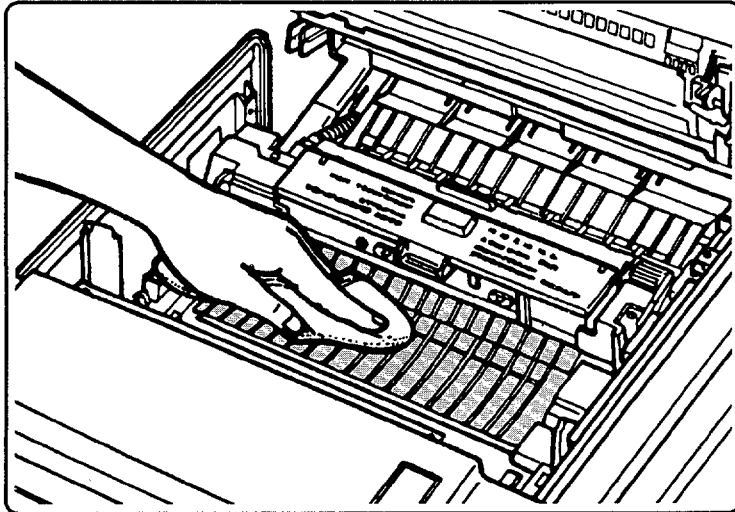


Figure 4-5. Cleaning the Feed Guide Assembly

Fusing Assembly

Periodically cleaning the Fuser Separation Pawls (claws) (see Figure 4-6) will help prolong the life of the printer's Fusing Assembly.

Warning

The fusing area gets **HOT**. Also, be careful not to get toner on clothing; it may stain.

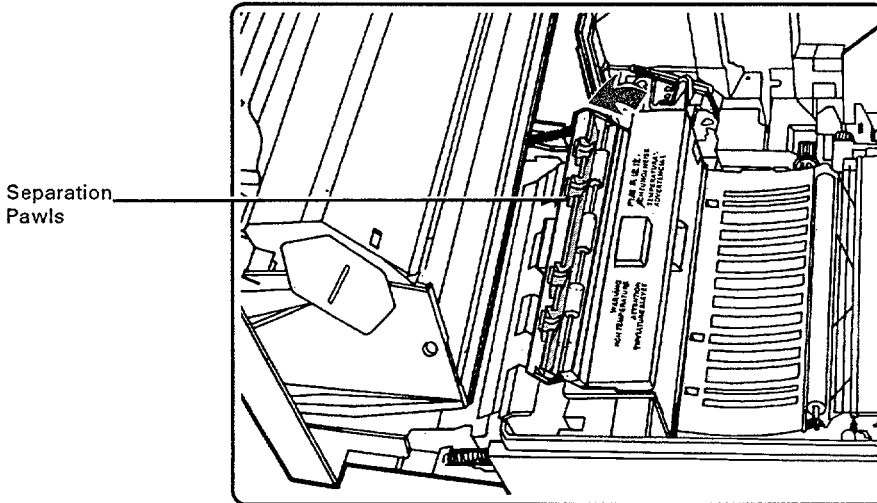


Figure 4-6. Cleaning the Fusing Assembly

Fuser Separation Pawls

To clean the pawls:

1. Turn the printer OFF.
2. Fully open the Top Cover Assembly.
3. Push the rear section of the Fusing Assembly (the section toward the rear of the printer) fully open. You will be able to see the four black plastic Fuser Separation Pawls (claws) along the lower edge of the section just pushed back (see Figure 4-6).
4. Clean the tip of each pawl with a cloth dampened with water. Avoid contact with the main portion of the Fusing Assembly.

Beam-To-Drum Mirror

The Beam-to-Drum Mirror can be easily damaged. Normally, it can be cleaned by carefully blowing any debris off its surface.

Caution



Newer assemblies contain a first surface mirror (i.e., a mirror with its reflective coating on the top, or *first*, surface) which can be easily damaged. *Do not clean the mirror unless absolutely necessary* (e.g., fingerprints, water condensation, etc.).

If additional cleaning is required, proceed as follows:

1. Access the Beam-to-Drum Mirror, located under the Top Cover Assembly, by moving the Mirror Shutter Assembly to the right (freeing the lever) and swinging it up and out of the way (see Figure 4-7, also "Mirror Shutter Assembly" in Chapter 6).
2. Carefully clean the mirror with a clean, lint-free wipe, *dampened only with a cleaning fluid approved for a camera lens.*

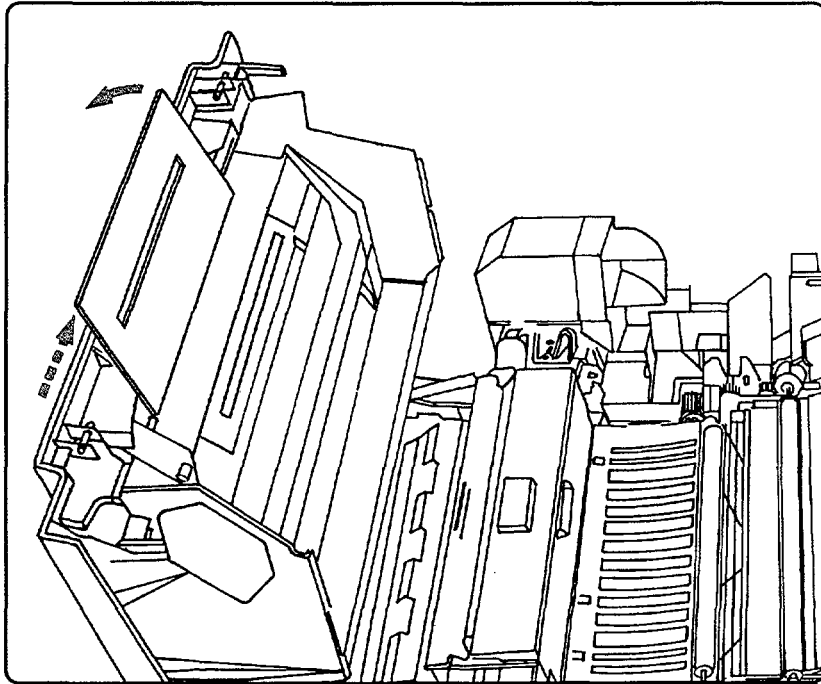


Figure 4-7. Cleaning the Beam-to-Drum Mirror

Primary Corona

Because the Primary Corona is delicate, it should only be cleaned when print quality begins to degrade (typically, dark vertical streaks on the page).

Caution



Clean the Primary Corona wire using only the pad-end of the cleaning brush provided. Using a cotton swab or other cleaning tool may break the wire, requiring replacement of the EP-S Cartridge.

1. Turn the printer OFF.
2. Open the printer's Top Cover Assembly.
3. Remove the EP-S Cartridge from the printer.
4. Lift out the cleaning brush, as shown in Figure 4-8.
5. Carefully insert the felt-tipped end of the brush in one end of the EP-S cartridge slot, as shown in Figure 4-9. (The brush will fit only one way. Look carefully at Figure 4-9 for the correct way to position the cleaning brush.)
6. Slide the brush back and forth a few times to clean the Primary Corona wire.
7. Return the brush and the EP-S Cartridge to the printer.

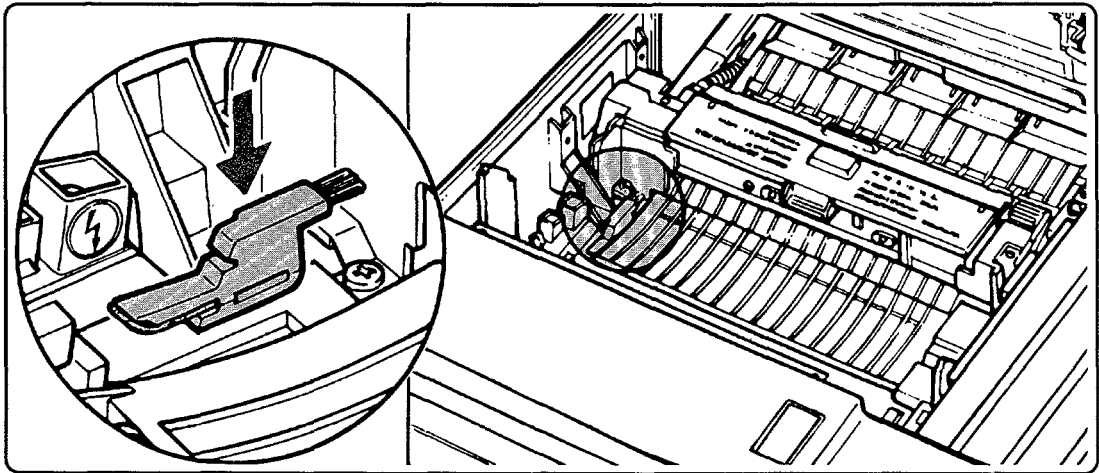


Figure 4-8. Cleaning Brush Location

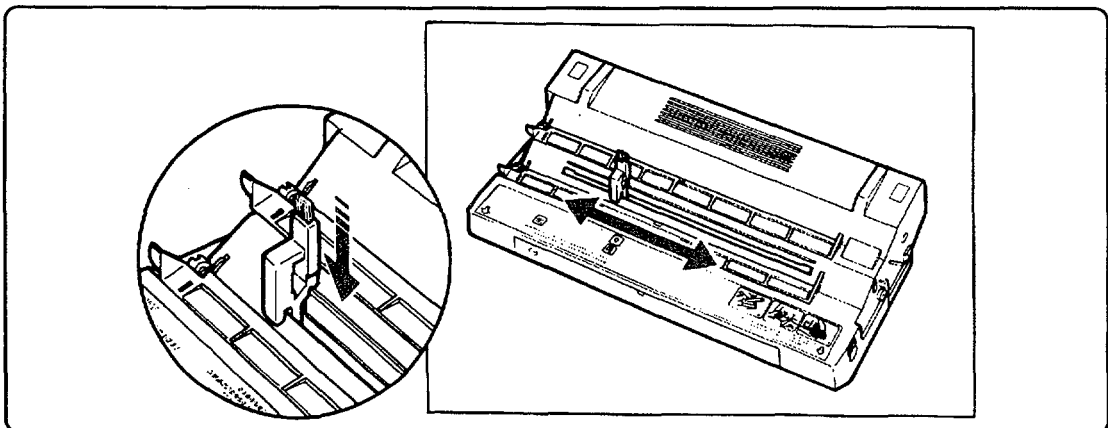


Figure 4-9. Cleaning the Primary Corona Wire in the EP-S Cartridge

4-5. CLEARING PAPER JAMS

If 13 PAPER JAM appears in the display window, open the printer's Top Cover Assembly and look for jammed paper. Paper jams occur mainly in the following three areas:

- Paper Pickup area.
- Transfer Guide area.
- Fusing Assembly area.

The three areas in the printer paper path mentioned above are illustrated in Figure 4-10 below:

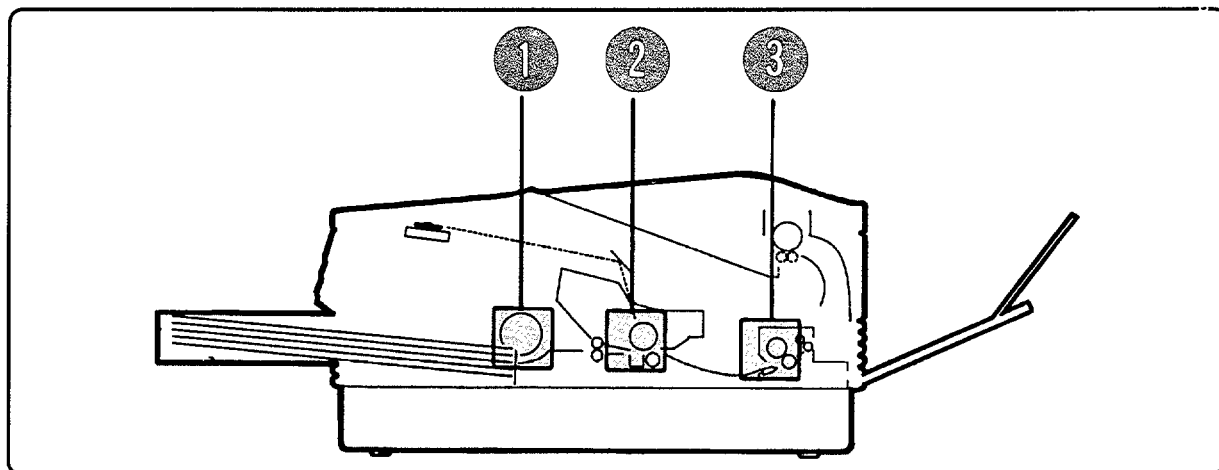


Figure 4-10. Paper Path and Jam Areas

Paper Pickup Area

Open the Registration Assembly cover and, if necessary, take out the paper tray to remove jammed paper (see Figure 4-11).

Caution



Do not attempt to pull paper that has jammed back through to the front of the printer. This will result in damage to the Registration Assembly.

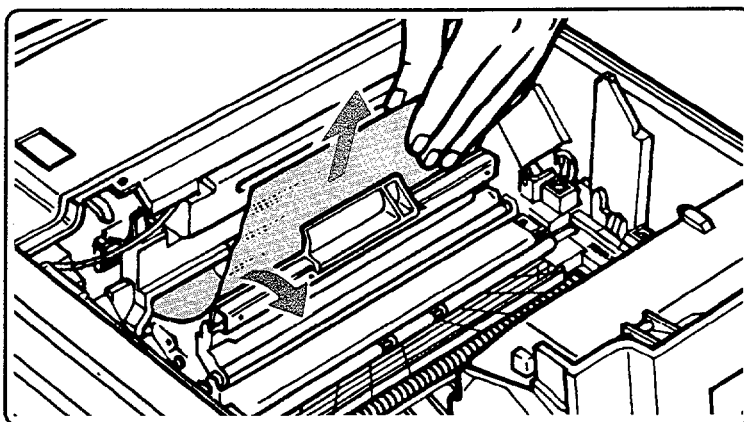


Figure 4-11. Clearing Jams in the Paper Pickup Area.

Transfer Guide Area

Open the Registration Assembly cover (Transfer Guide Lock) and remove jammed paper as shown in Figure 4-12.

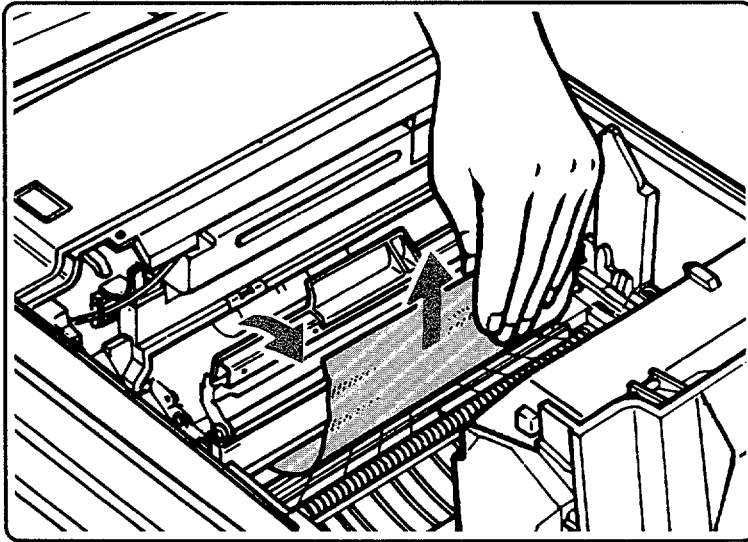


Figure 4-12. Clearing the Transfer Guide Area.

Fusing Assembly Area

Open the rear door of the Fusing Assembly and remove the jammed paper (see Figure 4-13). Pull the sheet *back* out of the fuser (as shown) to prevent contamination from unfused toner.

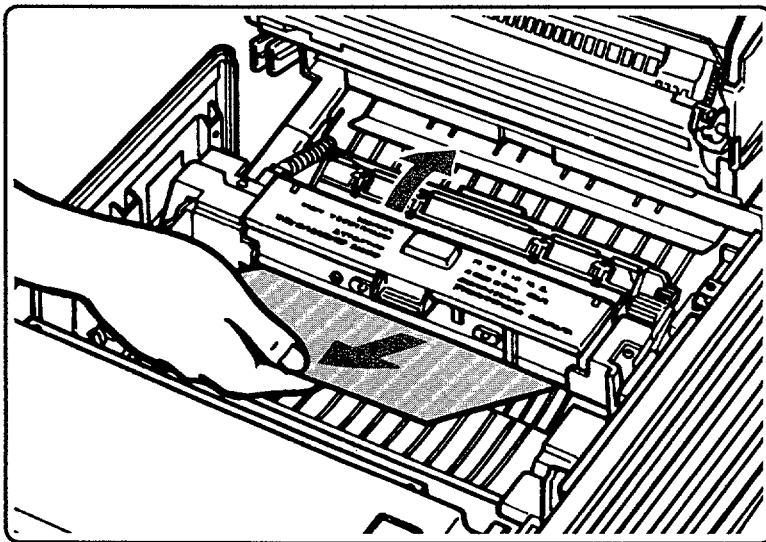


Figure 4-13. Clearing the Fusing Assembly Area.

4-6. OZONE FILTER REPLACEMENT

Ozone is a colorless gas generated by all laser printers and photocopiers. It may be perceived as pungent to those sensitive to its odor. The Ozone Filter, a customer-replaceable item, removes this odor. The filter should be replaced every 50,000 pages. If the printer is being operated in a confined environment, it may need to be replaced more often. Visual inspection will not show that a filter is dirty; page count is the only reliable indicator on which to base a decision to change a filter.

On older HP 33440 printers, it may be necessary to remove the Ozone Filter Mount to change the filter. Until the printer is updated, it is HP's responsibility to change the Ozone Filter. On these models, the Ozone Filter Mount can be upgraded to allow the filter to be changed without removing the mount. Refer to Service Note 33440A-7 and to Chapter 6, Section 6-3.

Conditions that may generate ozone complaints are:

- Multiple laser printers and/or copiers in a confined area.
- Extremely low relative humidity.
- Poor room ventilation.
- Printer exhaust port directed toward the face of personnel.
- Ozone Filter in poor condition (i.e., over 50,000 page count).
- Long, continuous printing combined with any of the above.

Examine the printer's environment to determine if any of the preceding conditions exist. It may be necessary for the customer to take corrective action to ensure the printer's environment is free of conditions that may generate an ozone complaint.

To replace a user-replaceable filter:

1. The Ozone Filter is located in the housing on the inner right side of the printer (see Figure 4-14).
2. Switch printer OFF and open the Top Cover Assembly.
3. Slide the filter out and replace it with a new filter.

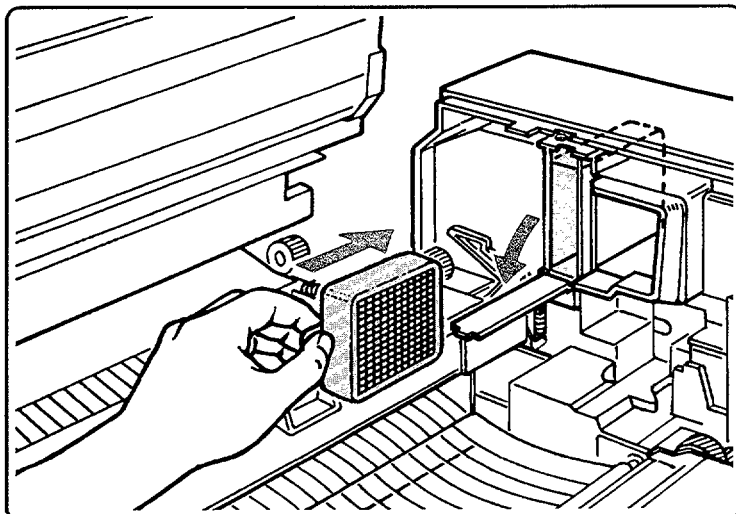


Figure 4-14. Ozone Filter Replacement

4-7. FUSER CLEANING PAD REPLACEMENT

To replace the Fuser Cleaning Pad:

1. Open the Top Cover Assembly.
2. Open the Fusing Assembly top cover (green felt cover).
3. Remove existing cleaning pad (see WARNING below).
4. Use the felt end of the new cleaning pad to wipe the Fusing Assembly roller.
5. Discard the felt end of the cleaning pad and insert the new cleaning pad.
6. Lower the Fusing Assembly cover (it does not close tightly).
7. Close the printer's top cover and turn the printer ON.

Warning



The Fusing Roller gets **HOT**. Be sure to hold the Cleaning Pad by the green tabs as shown in Figure 4-15.

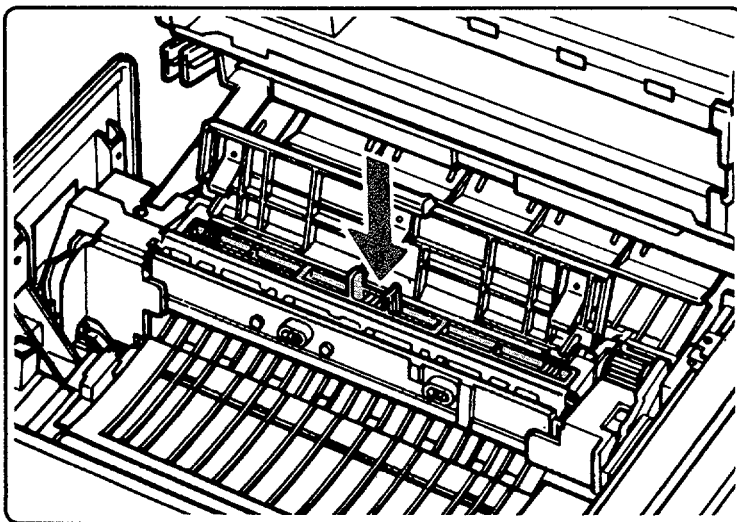


Figure 4-15. Replacing the Cleaning Pad

4-8. EP-S CARTRIDGE LIFE AND USE

Cartridge Life

The electrophotographic (EP-S) cartridge is a clean and convenient means of supplying the consumable items needed in the printing process. When using either the HP 33440 or HP 33449 printer for typical word processing applications, an EP-S Cartridge will print approximately 4000 pages. If average page coverage is light (a typical page of text has a great deal of "white space"), the EP-S Cartridge should last longer. If the application requires a denser page coverage (graphics and forms, for example), then the EP-S Cartridge will not last as long.

The life of an EP-S Cartridge can be extended by operating the printer with the print density adjustment dial set on a higher number (for lighter prints). See *Adjusting Print Density* on the following page. Also, see Chapter 2, Section 2-3, for EP-S Cartridge storage data.

Caution Do NOT attempt to refill a used cartridge. Damage to the printer can result.



"16 TONER LOW" Message

The 16 TONER LOW message indicates that the amount of toner in the EP-S Cartridge is getting low. White streaks will soon appear on printouts. For maximum usable life, remove the EP-S Cartridge and rotate around its long axis (see Figure 4-16) to distribute the remaining toner. Although the 16 TONER LOW warning may still be displayed, the fadeout should clear up allowing up to 100 more pages to be printed. If the fadeout condition persists, the EP-S Cartridge must be replaced.

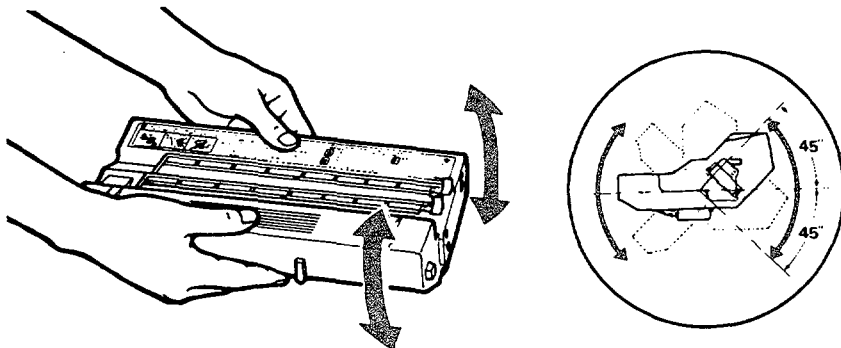


Figure 4-16. Distributing Toner in the EP-S Cartridge

4-9. PRINT DENSITY ADJUSTMENT

Print density refers to the relative darkness of the print on the paper. Dense print appears very black with a slightly *heavier* look. Less dense print looks lighter, and solid-filled areas may not be completely black.

When print density is set at a low number, toner is used at a faster rate, reducing the life of the EP-S Cartridge. Printing with the print density set to a higher number is a good way to conserve toner when darker print is not necessary.

To adjust print density:

1. Open the printer's Top Cover Assembly.
2. Use the numbered green dial located at the left side toward the front of the printer (see Figure 4-17) to adjust density: "1" is the darkest setting, "9" is the lightest. An initial setting of "5" is recommended.
3. Firmly close the printer's Top Cover Assembly.

Note

When using heavier paper and envelopes, the print density dial may need to be set to a lower (darker) setting to minimize background.

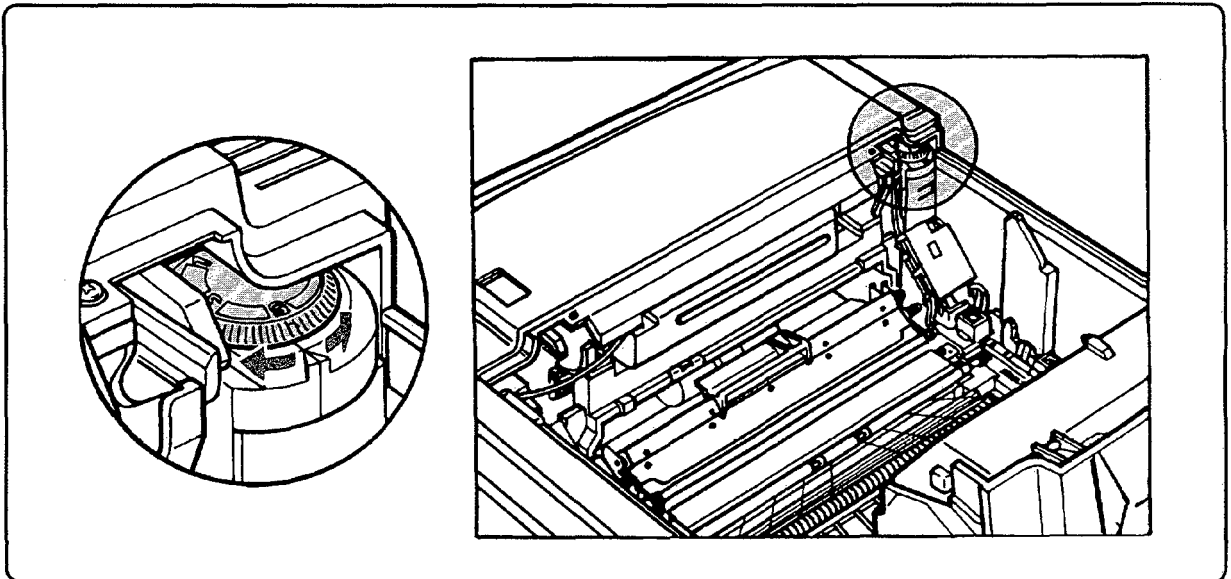


Figure 4-17. Adjusting Print Density

Note

The Resolution Enhancement feature of the HP 33449 and the density adjustment affect each other. See Chapter 3, Section 3-4, for proper adjustment procedures.



FUNCTIONAL OVERVIEW

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5-1. INTRODUCTION

This functional overview of the HP 33440 and HP 33449 printers is designed to provide the service representative with a general understanding of the processes which occur during printing. The diagram below (Figure 5-1) groups the four basic functional blocks discussed in this chapter:

- Section 5-2: Image Formation System.
- Section 5-3: Paper Pickup/Feed System.
- Section 5-4: Machine Control System (DC Controller PCA).
- Section 5-5: Interface System.
- Section 5-6: Power Distribution.

For additional details about how the printers function in various operational situations, refer also to Chapter 7, "Troubleshooting."

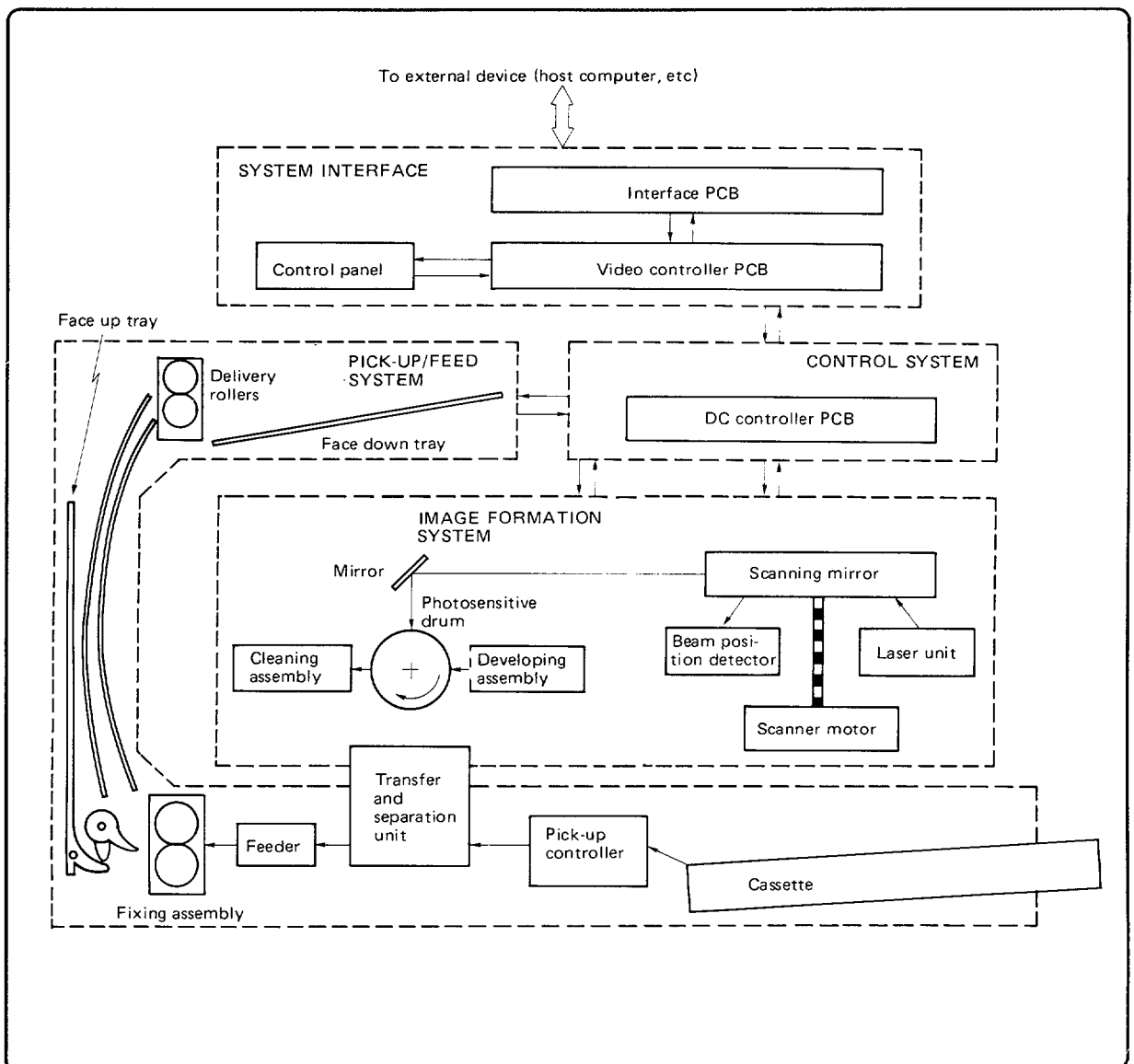


Figure 5-1. Diagram of Functional Blocks for HP 33440 and HP 33449 Printers

5-2. IMAGE FORMATION SYSTEM

Overview

Laser printing requires the interaction of several different areas of technology (mechanical, electronics, optics, electrophotographics, etc.) which must be coordinated to produce a printed page. The first in the sequence of processes, image formation, centers around the photosensitive drum contained in the Electrophotographic (EP-S) Cartridge and consists of four progressive stages:

- Cleaning.
- Conditioning.
- Writing.
- Developing.

Two additional stages, performed outside the EP-S Cartridge, are:

- Transferring.
- Fusing.

Most image formation system components which undergo wear or degradation (consumable components) are conveniently assembled in the replaceable EP-S Cartridge. Because this makes maintenance essentially an operator's task, it eliminates the need for a service call when these parts must be replaced. The EP-S Cartridge contains the photosensitive drum, Primary Corona, developing station, toner cavity, and cleaning station. A cross-section of the EP-S Cartridge detailing the image formation system and its relationship to other printer components is illustrated in Figure 5-2.

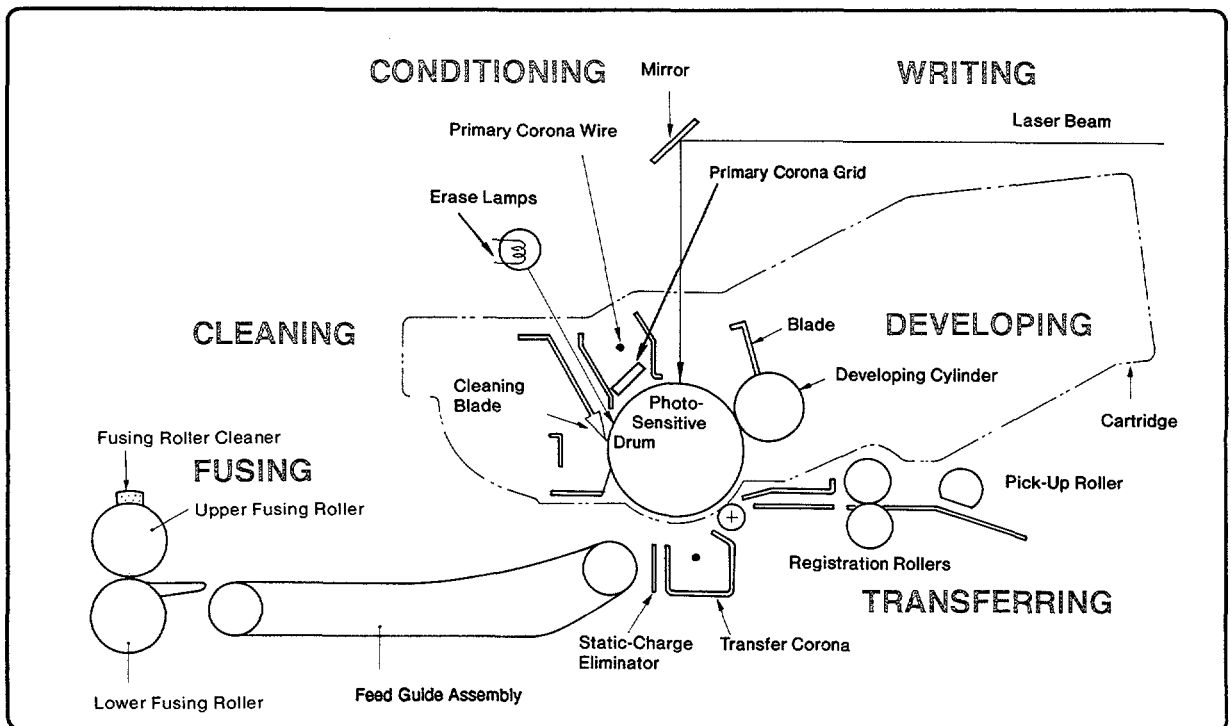


Figure 5-2. Diagram of EP-S Cartridge Illustrating Image Formation System

Photosensitive Drum

The photosensitive drum—the core of the image formation system—has special properties which allow an image to be formed on its surface and then transferred to paper. The drum is an extruded aluminum cylinder which is coated with a non-toxic layer of organic photoconductive material (OPC). The aluminum base of the drum is electrically connected to ground.

The OPC material has properties similar to a photodiode. It becomes electrically conductive (in one direction only) when exposed to light. Negative charges deposited on the surface of the drum conduct to the aluminum (zero potential) base of the drum when exposed to light. Areas of the drum not exposed to light remain nonconductive and retain the initial charge.

Caution



Do not expose the drum to direct sunlight or any other bright light source; permanent damage to the drum could occur.

Drum Sensitivity

Because all drums cannot be manufactured to the exact same sensitivity levels, they are tested at the factory and given a rating of high, medium, or low sensitivity (see Table 5-1). Depending on this rating, tabs are placed on the cartridge which enable printer microswitches which, in turn, control laser power output to adjust for the drum's sensitivity level. These microswitches also indicate whether or not the EP-S Cartridge is installed.

Table 5-1. Drum Sensitivity Tab Settings

Drum Sensitivity	CSENS 1	CSENS 2
High	L	L
Medium	L	H
Low	H	L
Cartridge not Installed	H	H
L = Switch Activated		

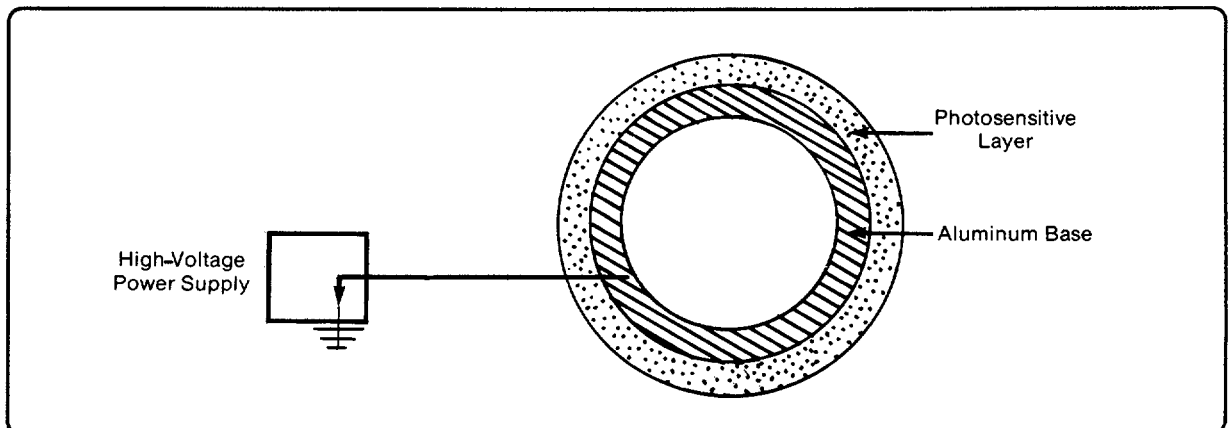


Figure 5-3. Photosensitive Drum

CLEANING: Stage One

During the first stage of the image formation process, the drum's surface is prepared to hold an image through a physical and electrical cleaning process. During printing, the drum is constantly rotating, making several complete rotations per printed page. Before forming the image for a given section of print, leftover toner from the previous rotation of the drum must be removed. This is accomplished by a rubber cleaning blade which scrapes toner off the drum and into a debris cavity. A sweeper blade in the debris cavity rotates, sweeping toner away from the area near the drum (see Figure 5-4).

The drum is electrostatically cleaned by the Erase Lamps (see Figure 5-5). These five small lamps, located in the hinged Top Cover Assembly, illuminate the drum's photosensitive material to neutralize any electrical charges which may have previously been on the drum. The illumination of these lamps is controlled by the Machine Control System (DC Controller PCA).

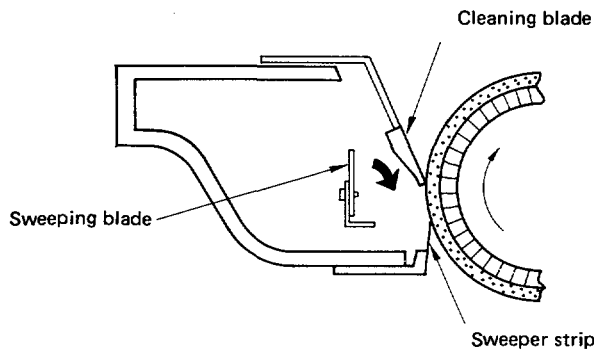


Figure 5-4. Drum Cleaning Station

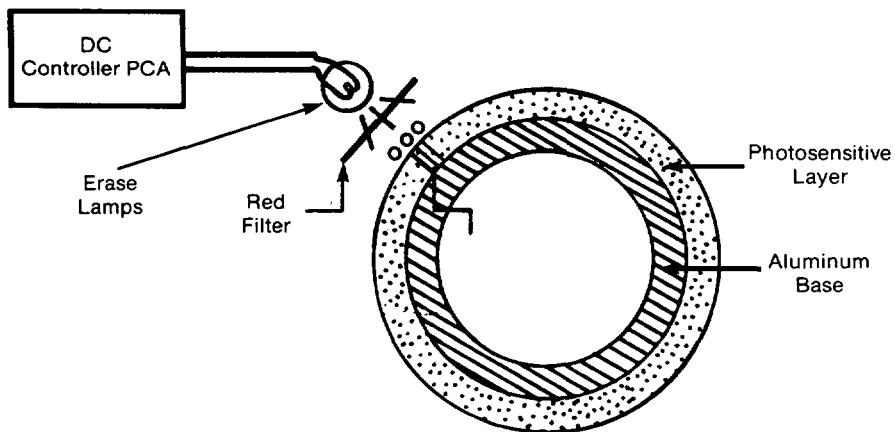


Figure 5-5. Erase Lamp Effect

CONDITIONING: Stage Two

After the drum has been physically and electrically cleaned, it must be conditioned. The conditioning process consists of the application of a uniform negative charge on the surface of the drum by the Primary Corona Assembly (see Figure 5-6) located inside the EP-S Cartridge. This -6 KV charge, applied to the corona wire by the High Voltage Power Supply Assembly, creates a *corona effect*. This means that the air surrounding the wire is ionized and no longer acts as an insulator. Negative charges from the wire migrate to the surface of the drum.

The Primary Corona grid (see Figure 5-6), positioned between the corona wire and the drum, regulates the voltage applied to the drum's surface, so that a uniform -600 V charge is deposited. The corona grid is connected to a varistor in the High Voltage Power Supply Assembly which bleeds off any extra current which would raise the surface voltage above the desired level.

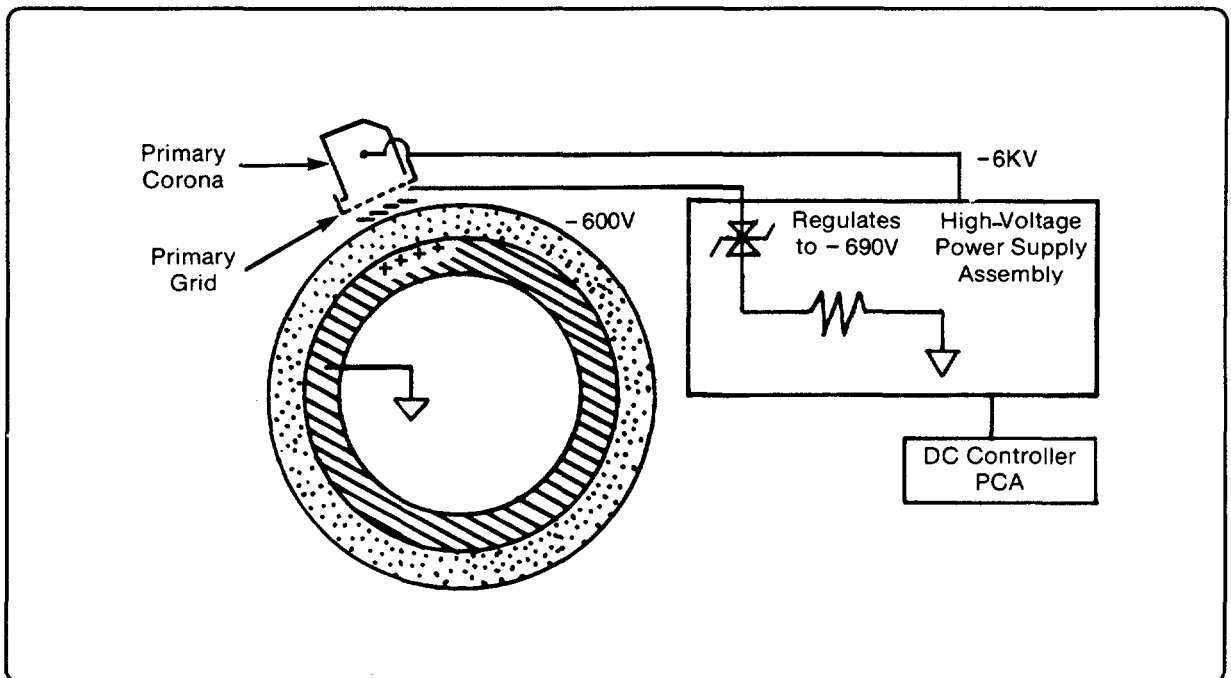


Figure 5-6. Primary Corona Assembly

WRITING: Stage Three

After rotating past the conditioning station, the drum has a uniform -600 V potential on its surface. At the writing station, a laser beam is used to discharge this potential in selected areas by focusing laser light on selected portions of the photoconductive drum. This creates what is known as an electrostatic image. This image is later developed into a visible image.

The following is an explanation of how laser light is controlled to achieve the electrostatic image described above. Laser light is produced by a small laser diode which is turned on and off by supplying or denying power. The fixed focus beam of the laser diode is directed onto a six-faced rotating polygon mirror (see Figure 5-7). As the mirror rotates, the beam reflected off the mirror sweeps in an arcing fashion. Through a set of mirrors and lenses, the swept beam is brought into focus to describe a horizontal line on the photosensitive drum. The beam reaches the drum through an opening in the top of the EP-S Cartridge.

Because the beam is sweeping, the entire length of the drum can be covered by the beam; similarly, because the drum is rotating, the entire circumference can be covered. This sweeping of the drum and modulation of the beam allows exposure of all desired surfaces on the drum (see Figure 5-8). This is similar to how the electron beam in a television set scans to form a video image on the screen.

The speed of the Scanner Motor (which rotates the polygonal mirror) and the speed of the main motor (which rotates the drum) are synchronized so that each successive sweep of the beam is offset on the surface of the drum by $1/300$ of an inch. The beam can also be turned on and off at such a rate as to place an intermittent series of dots of light every $1/300$ of an inch in the horizontal direction. This is how the printer achieves its 300×300 -dots-per-square-inch resolution. (Note that one aspect of the HP 33449's Resolution EnhancementTM feature allows for more defined dot placement in the horizontal direction.) The Scanner Motor is controlled by the SCNCONT line from the DC Controller. This voltage level varies depending on the Scanner Motor speed feedback signals FG+ and FG- (see Figure 5-15 also).

Before the beam reaches the drum at the beginning of each sweep, it is reflected off a small mirror into an optical fiber cable. This momentary pulse of light is sent down the optical fiber to the DC Controller PCA where it is converted to an electrical signal which, in turn, is used to synchronize the output of data for one sweep (scan line). This pulse—called the Beam Detect pulse—is also used to diagnose problems with the laser or scanner motor. (See Figure 5-8.)

After passing the writing station, the drum's surface has an invisible electrostatic latent image. The portions of the drum not exposed to the laser are still at the -600 V potential (placed there by the Primary Corona) while those portions exposed to light have been discharged to approximately -100 V.

Note



Because the HP 33440 and HP 33449 printers are class I laser products, they are safe for office or data processing use. The laser used in the printer is a solid state, infrared, class III laser.

Warning



Although the infrared laser beam is invisible, eye damage may result if direct or indirect (reflected) eye contact with the laser beam should occur. Heed all **CAUTIONS** and **WARNINGS** when working on the printer with covers removed or with the laser unit itself.

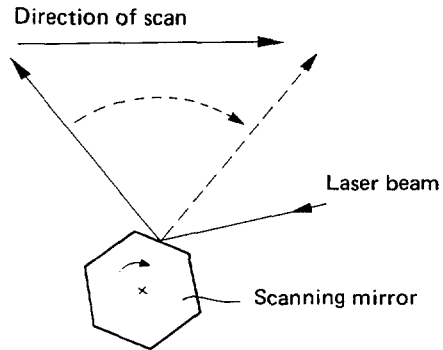


Figure 5-7.
Rotating Scanner Mirror
(Top view)

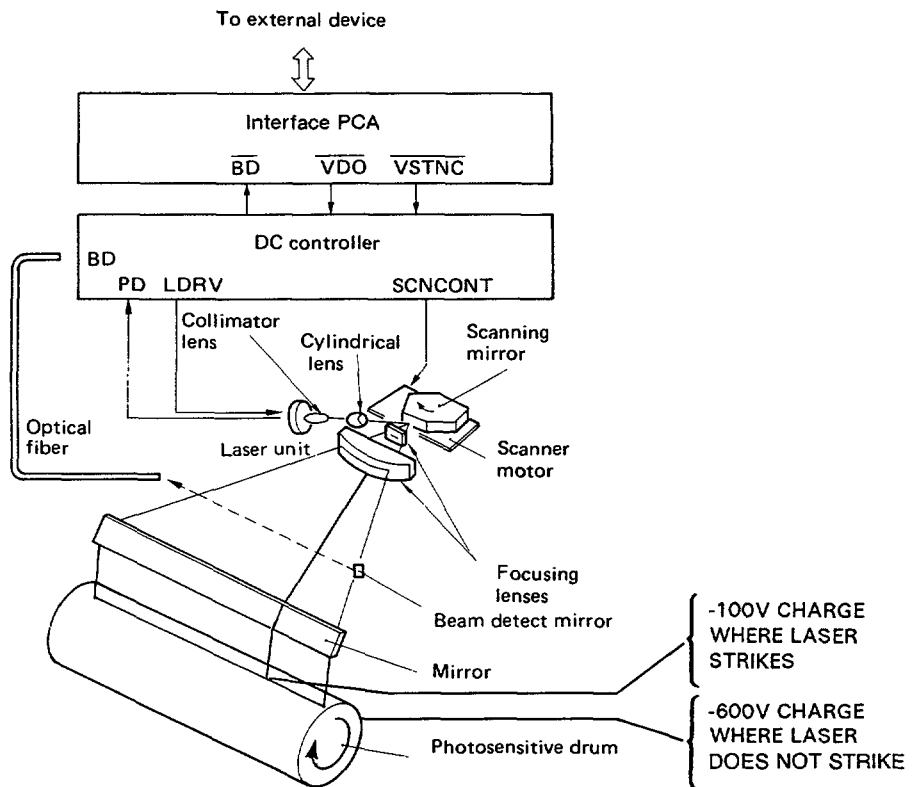


Figure 5-8. Drum Signals

DEVELOPING: Stage Four

At the developing station, the invisible electrostatic image is developed into a visible image on the drum when toner from a developer cylinder is transferred to discharged areas on the drum. The developer consists of a rotating metallic cylinder, a fixed magnet that runs the length of the cylinder, a toner cavity, and a toner-brush-height-control blade. The toner in the toner cavity is a powdery substance made of black plastic resin bound to iron particles. The iron in the toner causes it to be attracted to the magnet inside the cylinder. As the cylinder rotates, the brush-height-control blade limits the amount of toner on the cylinder.

The plastic toner particles acquire a negative surface charge by rubbing against the cylinder which is connected to a negative DC supply (see Figure 5-9). This electrostatic charge causes the toner particles to be attracted to the areas of the drum which have been exposed to laser light and repelled from the areas not exposed (see Figure 5-9). An AC potential is also applied to the developer cylinder to further assist toner particles to overcome the attraction of the magnet and to pull toner back to the cylinder from unexposed areas, thus improving density and contrast.

The DC bias of the developer cylinder can be user-adjusted with the Print Density control. This changes the attractive force between toner and drum, pulling more or less toner to the drum.

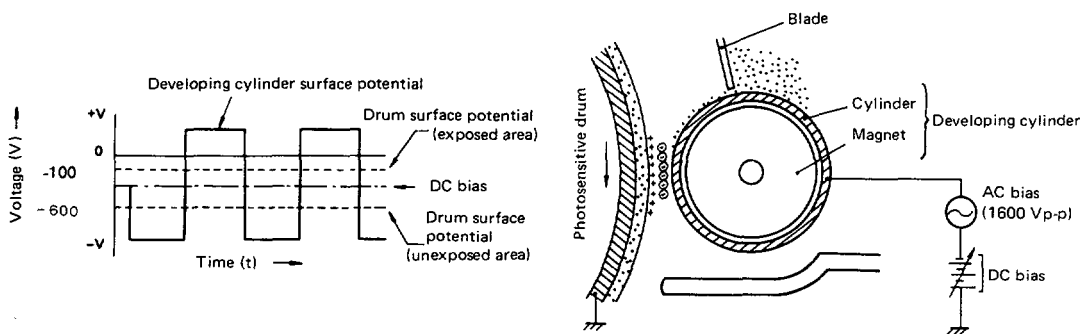


Figure 5-9. Developing an Image

Note



The charges making up the latent image shown in Figure 5-9 are negative but they are shown as positive in the illustration because they are less negative than the charges on the toner.

TRANSFER: Stage Five

At the transfer station, the toner image on the drum is transferred to the paper. A corona assembly is positioned behind the paper so that the paper, which is traveling at the same speed the drum's surface is rotating, contacts the drum. This corona produces positive charges which collect on the back of the paper. Because the positive charges on the paper are stronger, they pull the negatively charged toner particles off the drum (see Figure 5-10).

As the paper and drum continue to advance, the small radius of the drum and the stiffness of the paper cause the paper to naturally peel away from the drum (see Figure 5-11). Separation is also assisted by a high negative voltage being applied to a row of sharp metal teeth—the Static Charge Eliminator. This Static Charge Eliminator weakens the attractive forces between the negatively charged drum surface and positively charged paper. Without this assistance, thin papers could conceivably wrap around the drum. From the transfer station, the paper moves to the fusing station and the drum rotates back to the cleaning station to prepare it to receive the next section of print.

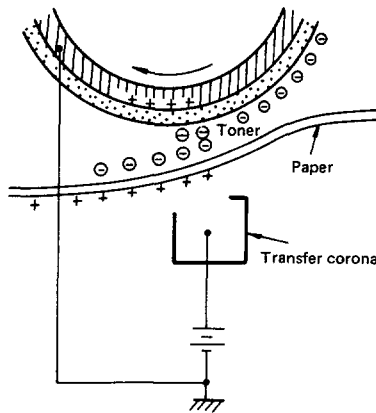


Figure 5-10. Transfer of Toner Image

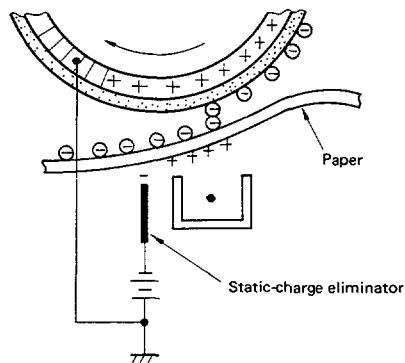


Figure 5-11. Paper Separation

FUSING: Stage Six

Until the paper reaches the fusing station, the toner is held on the paper only by gravity and weak electrostatic forces. At the fusing station, toner is melted and forced into the paper by heat and pressure to produce a permanent image. The fusing station (see Figure 5-12) consists of an upper non-stick roller that is heated from the inside by a high intensity quartz lamp and a lower soft roller that allows pressure to be applied over a large contact area between the paper and the upper fusing roller. At this point, the toner is melted and squeezed into the paper fibers. To keep the toner or paper from sticking to the Fusing Roller, the roller is covered with a non-stick, Teflon-type resin. A cleaning pad, which is in contact with the Fusing Roller, applies a thin coat of silicone oil to the surface of the roller to also help prevent sticking. The cleaner pad also serves to wipe off any toner or debris that is transferred to the roller.

The Fusing Roller temperature is monitored by the Machine Control System via a thermistor. The Machine Control System maintains a temperature of 165° C (330° F) during standby mode and 180° C (355° F) during printing.

A thermoprotector switch is also located in the Fusing Assembly, adjacent to the thermistor. The thermoprotector shuts down (opens the power circuit to the fuser bulb) when the temperature is in excess of 210° C (410° F). If the fusing system is shut down by overheating, an ERROR 50 is displayed. If this occurs, the printer must be powered off and the thermoprotector replaced. The printer must remain powered off for at least seven to ten minutes or the ERROR 50 condition will remain.

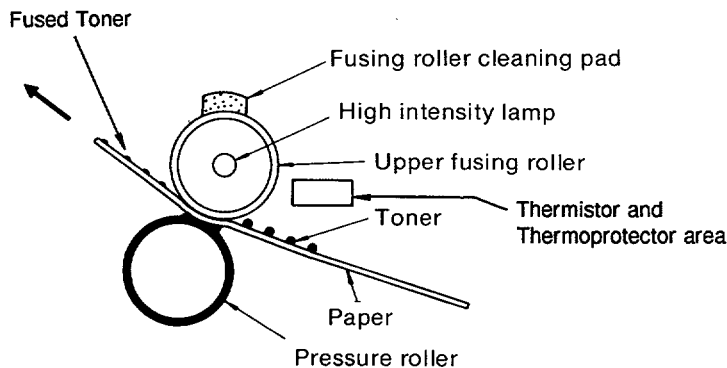


Figure 5-12. Fusing Process

5-3. PAPER PICKUP/FEED SYSTEM

Paper Path

The paper pickup and feed system is responsible for picking paper from the input paper tray, delivering it to the image formation system at precisely the right time, feeding it to the fusing station, and delivering it to the output tray. Figure 5-13 illustrates the HP 33440/HP 33449 paper path. The cassette-feed paper path begins when the Machine Control System (DC Controller PCA), after receiving a print command, starts the Main Drive Motor. Approximately two seconds later, the Paper Pickup Solenoid is enabled and the Paper Pickup Roller makes one rotation and feeds paper to the Registration Rollers. Since the Registration Rollers are not turning at this time, the front edge of the paper bows (see Figure 5-14).

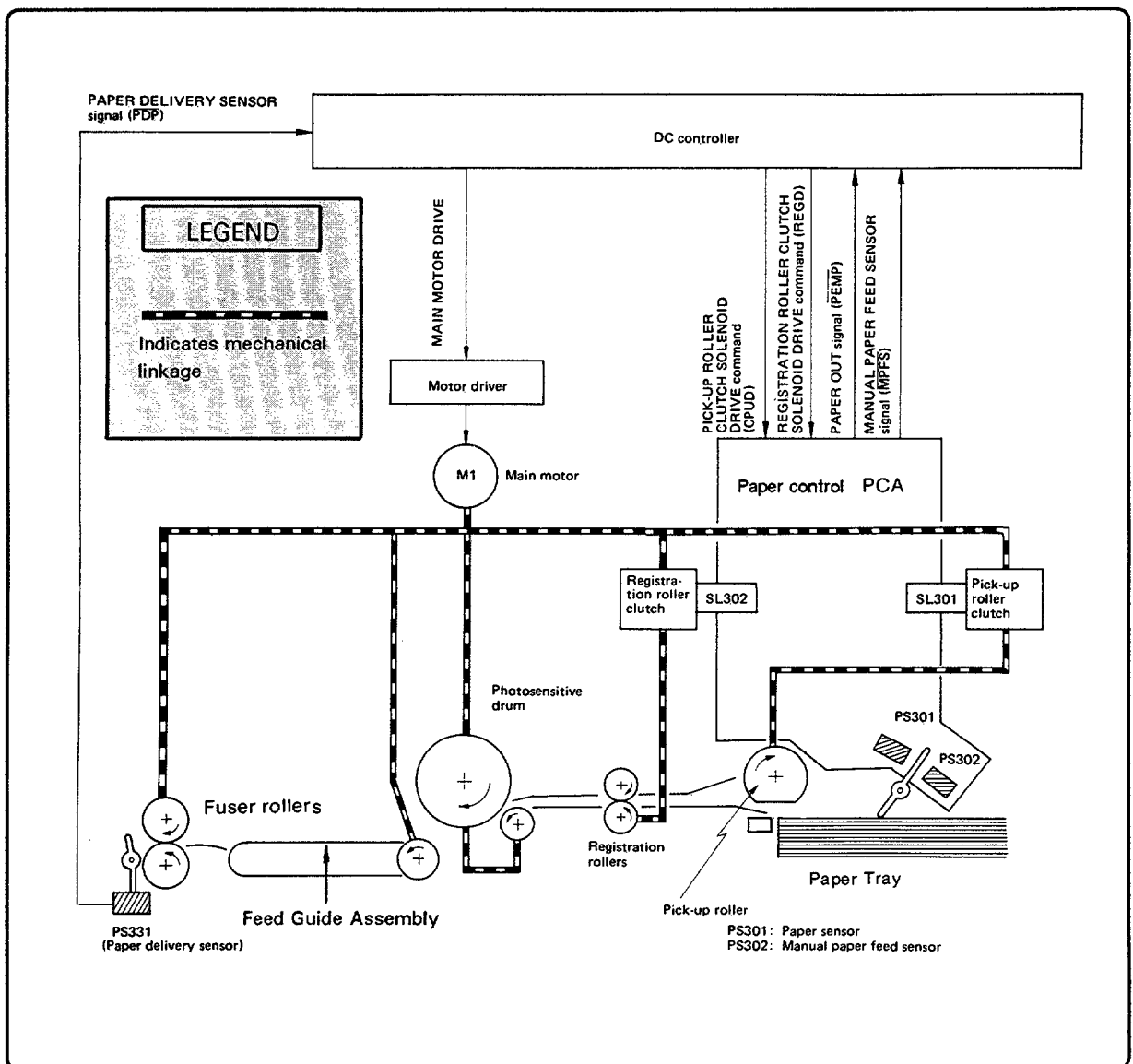


Figure 5-13. Paper Pickup/Feed System

The registration rollers align the leading edge of the paper with the leading edge of the image on the photosensitive drum. When the alignment is correct, the Registration Clutch Solenoid is activated and the rollers turn and advance the paper toward the photosensitive drum. After the print image has been transferred to the paper at the transfer station, the paper is fed into the Fusing Assembly by the Registration and Feed Rollers.

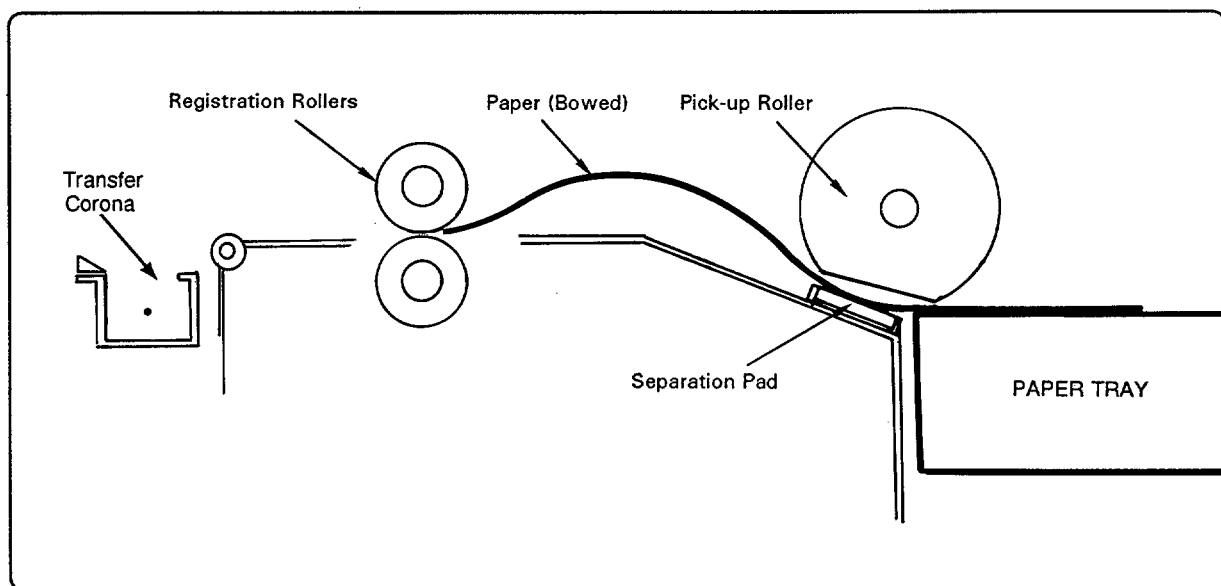


Figure 5-14. Paper Reaching the Registration Rollers

Manual Feed

The timing of manual paper feed is identical to the timing for cassette paper feed, except for the following points:

1. A different input paper sensor is used.
 - Cassette paper out sensor: PS301.
 - Manual feed paper sensor: PS302.
2. The initial warmup time for manual feed is longer. It is assumed that manual feed will be used for heavier media such as envelopes and heavier paper. Because these heavier papers will absorb more heat, the extra warmup time allows all components of the fusing system to reach the 180° C (355° F) temperature before paper movement begins, which is required for proper fusing of toner to these papers.

Paper Jam Sensing

The Paper Delivery Sensor (PS331) indicates when paper reaches and clears the fusing station. PS331 detects a paper jam in any of the following conditions:

- Paper does not **reach** the delivery sensor within the required time (delivery delay jam).
- Paper does not **clear** the delivery sensor within the required time (delivery jam).
- Paper is **present** at the delivery sensor when power is switched ON (paper was left inside the printer and the fuser cooled-off; if the fuser is hot it will eject the paper).

Main Drive

The Main Motor (M1) and Scanner Motor (M3) provide the mechanical drives necessary for printing. The Main Motor is controlled via a driver by commands output from the DC Controller. The Main Motor, via gear trains, drives the following:

- Pickup Roller.
- Registration Assembly.
- Drum (within EP-S Cartridge).
- Feed Rollers.
- Fusing Assembly.
- Delivery Rollers.

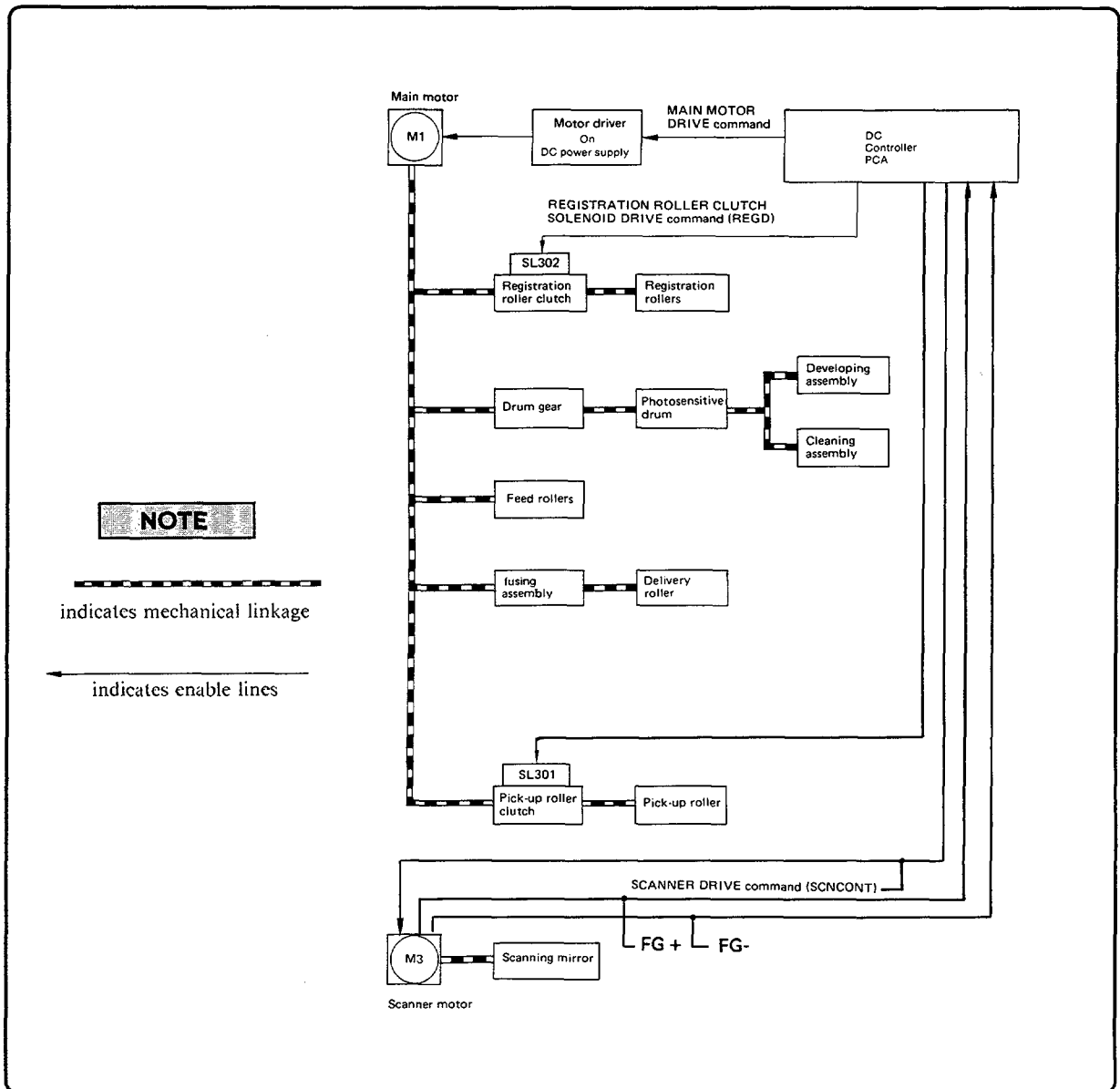


Figure 5-15. Main Drive System

5-4. MACHINE CONTROL SYSTEM

The DC Controller PCA—the machine control system—is responsible for coordinating all activities involved in the printing process. It drives the laser beam, coordinating dot pattern (video) data from the Interface/Formatter PCA with paper size, drum sensitivity, and laser beam motion information. The machine control system also controls and monitors paper motion, the high-voltage system, fuser temperature, erase lamps, and all motors. It also shares machine status information with the Interface/Formatter PCA so that proper diagnostic messages are displayed on the Control Panel (see Figure 5-16). A list of the signals monitored or controlled by the DC Controller PCA is in Chapter 7, Section 7-7.

In summary, the following items are controlled by the machine control system:

- Paper motion.
- Laser drive.
- Erase Lamps.
- Timing.
- Machine status.
- Paper size and availability.
- High-voltage system.
- Fuser temperature.
- Scanner and Main Motor drive.
- +24 V operation.

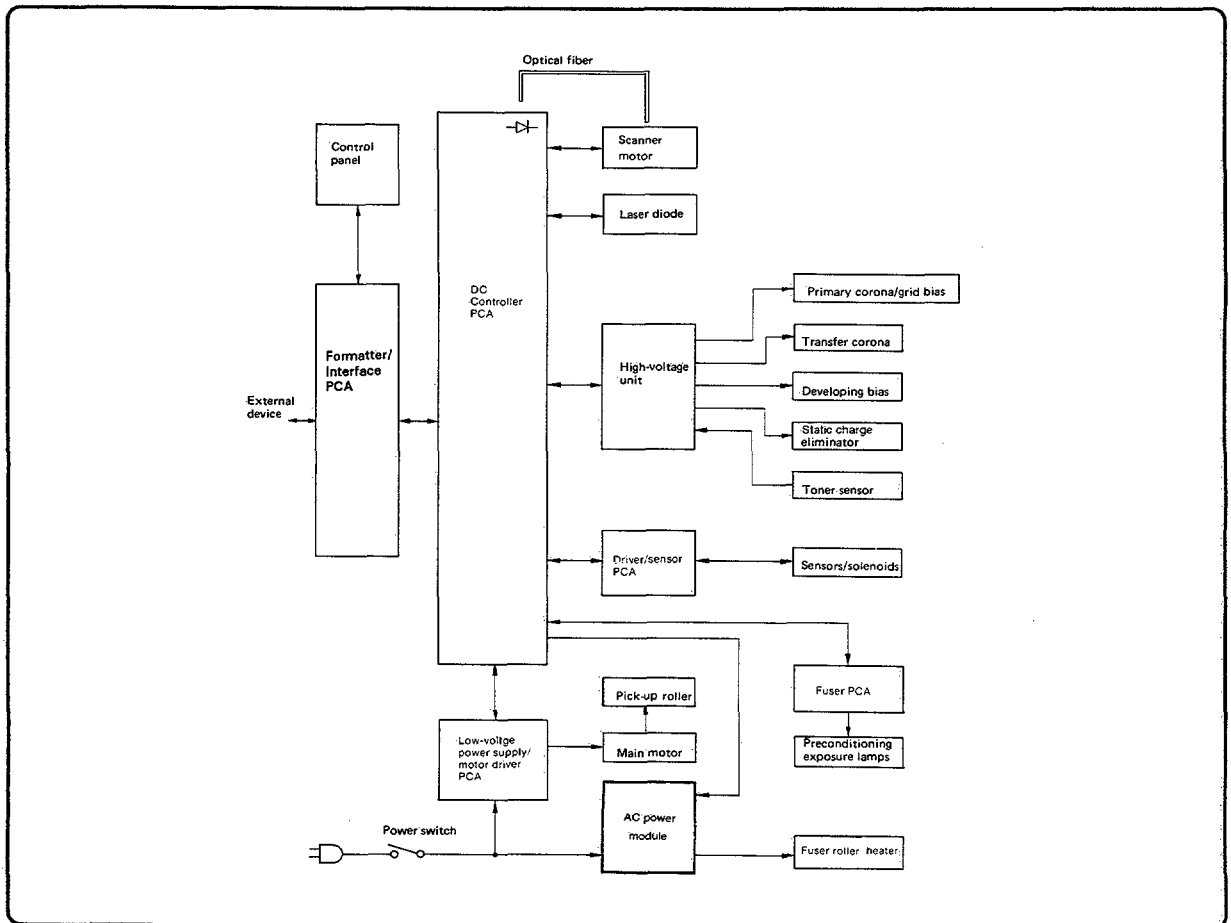


Figure 5-16. DC Controller Block Diagram

5-5. INTERFACE SYSTEM

General

For both the HP 33440 ("Interface PCA") and HP 33449 ("Formatter PCA"), the Interface/Formatter PCA is responsible for the following:

- Communicating with the host system, either through the standard serial or parallel ports or through the optional I/O interface, if installed.
- Monitoring operator interface via the printer's Control Panel and displaying printer status information to the operator.
- Communicating with the print engine (DC Controller PCA).
- Storing font information.
- Storing configuration information.
- Manipulating incoming data, such as conversion of ASCII character data into a binary page image that the print engine may use for creating a laser image on the photoconductive drum.

In addition, for the HP 33449 only, the Formatter PCA contains circuitry for Resolution EnhancementTM capable of modulating the DC Controller PCA's laser drive circuitry to produce "smoothed" black-to-white boundaries.

Optional cartridges may also be installed in connectors on the Interface/Formatter PCA to provide additional fonts for text printing or to overlay portions of machine code (ROM) for printer emulation. Proper communication between the Interface/Formatter PCA and the host system is established by configuration settings selected at the Control Panel. ASCII code and graphics data from the external device is then processed according to the Control Panel settings or printer commands and is converted to dot data. The dot data is used for modulating the laser.

Descriptions of Blocks in the HP 33440 Interface PCA Diagram

The HP 33440 Interface PCA Block Diagram is shown in Figure 5-17.

CPU (Central Processing Unit)

The CPU block contains a 16-bit microprocessor that executes programs stored in ROM to control the operation of the Interface PCA.

ROM (Read-Only Memory)

Besides storing microprocessor control programs, the ROM stores the dot patterns of internal character sets. Maximum ROM capacity is 1 Mbyte.

NVRAM (Non-Volatile Random Access Memory)

The NVRAM is a non-volatile random-access memory with a capacity of 32 bytes. Since its contents are not lost when power is switched off, it is used to store printing setup configuration information entered via the Control Panel and page count information.

SRAM (Static Random Access Memory)

The 4 Kbyte SRAM is used as a stack area in the 16 Mbyte address space accessed by the microprocessor (CPU).

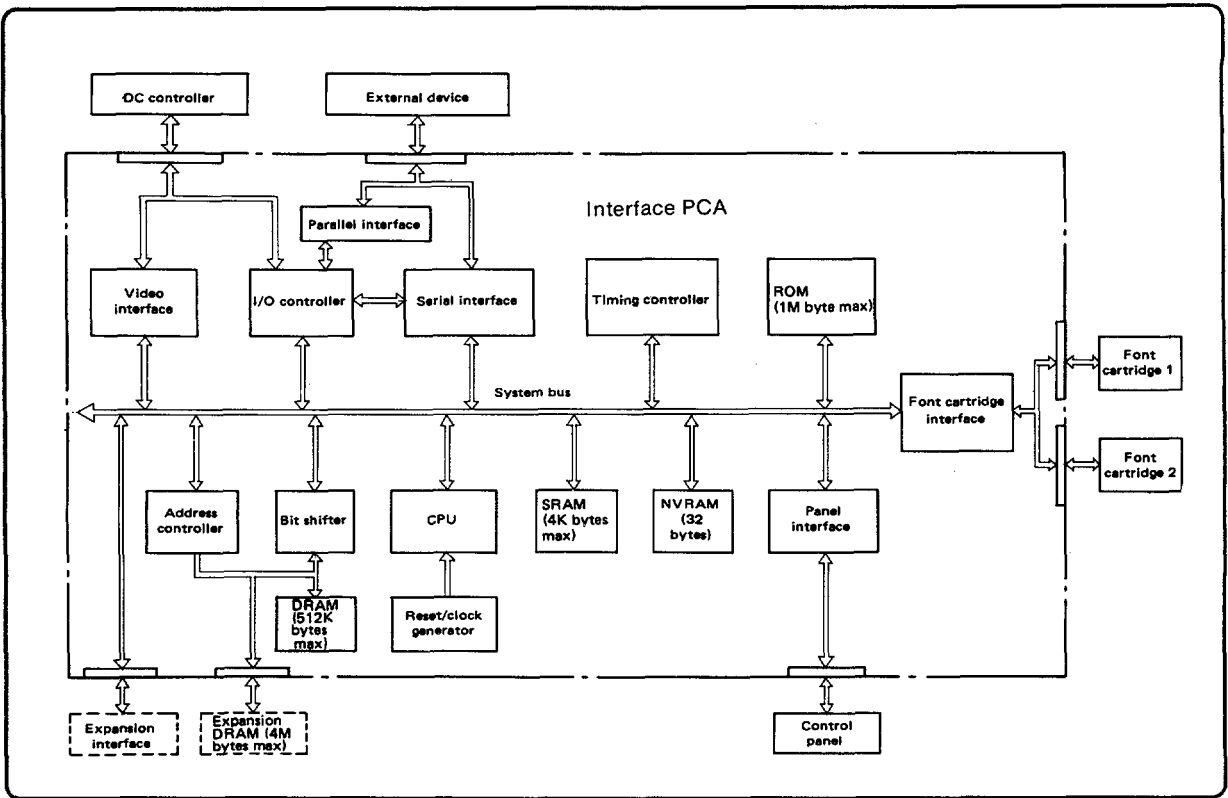


Figure 5-17. HP 33440 Interface PCA Block Diagram

Address Controller

The address controller is implemented as a single gate array circuit (GA1). Jumpers attached to the gate array enable the ROM address region to be changed. The ROM has a maximum capacity of 1 Mbyte and is used in four separate sections. The address controller also outputs address information enabling access to data in the Interface PCA's DRAM (maximum capacity of 512 Kbytes) and expansion DRAM (maximum capacity of 4 Mbytes).

DRAM (Dynamic Random Access Memory)

The DRAM is a dynamic random access memory with a maximum capacity of 512 Kbytes. It stores printing and font information input from the external device. It also stores page formatting information and other parameters required by the internal microprocessor. The microprocessor subdivides the DRAM memory space as required. An expansion memory board can be added to increase the DRAM by 1, 2, or 4 Mbytes, depending upon the board purchased.

Bit Shifter

The bit shifter is used to offset or overlay printed characters, and to shift data by 1 to 15 bits.

Timing Controller

The timing controller generates timing signals needed when data is written to or read from DRAM. It also generates DRAM refresh signals.

I/O Controller

The I/O controller controls the timing of data input from an optional I/O PCA to the microprocessor via the parallel interface connector. It also controls the timing of communication with the DC Controller.

Video Interface

The video interface has two 4-Kbyte scan buffer memories (SRAMs) through which printing information converted to dot data is output continuously to the DC Controller.

Font Cartridge Interface

"Font cartridges" are ROM cartridges which hold additional dot pattern data for different fonts. The font cartridge interface buffers the main bus from the font cartridge connectors.

Descriptions of Blocks in the HP 33449 Formatter PCA Diagram

General

The Block Diagram of the HP 33449 Formatter PCA is shown in Figure 5-18. An explanation of the blocks within the diagram follows:

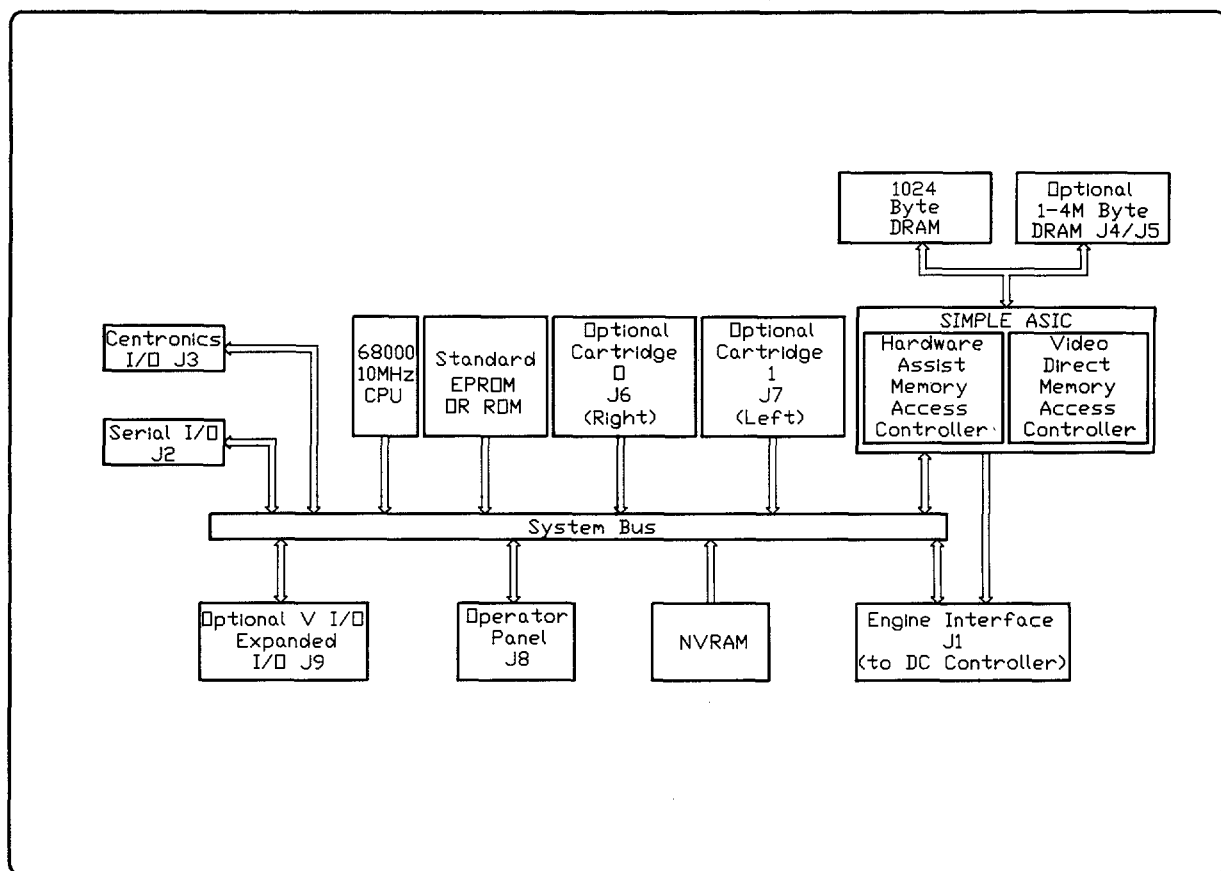


Figure 5-18. HP 33449 Formatter Block Diagram

ASIC (Application Specific Integrated Chip)

The Application Specific Integrated Chip (ASIC) is a custom-built integrated chip designed to assist the main microprocessor in formatting print image information. The ASIC has two subsystems: the dynamic memory controller and hardware assist logic, and the video direct memory access control. As the dynamic memory controller, the ASIC controls most DRAM access. The video direct memory portion of the ASIC prepares and provides serialized video data that is to be used for the print engine's laser subsystem.

CPU (Central Processing Unit)

This block contains a 16-bit microprocessor (Motorola 68000) that executes instructions stored in ROM to control operation of the Interface/Formatter PCA. The processor operates from a 9.83 MHz clock.

EPROM/ROM (Erasable Programmable Read Only Memory/Read Only Memory)

Besides storing the microprocessor control programs, the ROM (2 Mbyte Read Only Memory) stores internal character set patterns. Early units will be shipped with six 1-Mbit EPROMs and three 4-Mbit ROMs. Most units will have four 4-Mbit ROMs installed.

NVRAM (Non-Volatile RAM)

The NVRAM is a non-volatile random-access memory with a capacity of 1024 bits. Since its contents are not lost when power is switched off, it is used to store printing setup configuration information entered via the Control Panel and page count information.

DRAM (Dynamic Random Access Memory)

The DRAM consists of 1024 Kbytes of memory. The memory can be expanded by increments of 1 or 2 Mbytes up to a total of 4 Mbytes by installing accessory memory PCAs. This memory stores printing and font information input from the host system. The DRAM also serves as a temporary storage area for print image (dot) data prior to the data being sent to the print engine to create an image on the photoconductive drum.

Font Cartridge Interface

"Font cartridges" are ROM cartridges which hold additional dot pattern data for different fonts or contain ROM code to overlay internal ROM. The font cartridge interface buffers the main bus from the font cartridge connectors.

Note

For the HP 33449, functions described for the HP 33440 following the DRAM description are included under various headings above.



5-6. POWER DISTRIBUTION

Power distribution is illustrated in Figure 5-19. When the ON/OFF switch is set to ON, AC voltage is supplied to the DC Power Supply Assembly via the AC Power Module. Fuse F1 protects the DC Power Supply Assembly from current surges. The DC Power Supply provides the following voltages:

- +5 Vdc and -5 Vdc
- +24A Vdc and +24B Vdc

The RESET signal generated by the DC Power Supply Assembly results from any of the following conditions:

- When the power is initially switched ON.
- When the +5 Vdc power falls below the required level.
- When AC power is momentarily interrupted.

The +5 Vdc power supply is the first supply enabled and is the only voltage level required to "wake up" the main microprocessor on the DC Controller PCA. After the processor initializes itself, the processor generates the REMOTE signal which enables the +24 Vdc regulators.

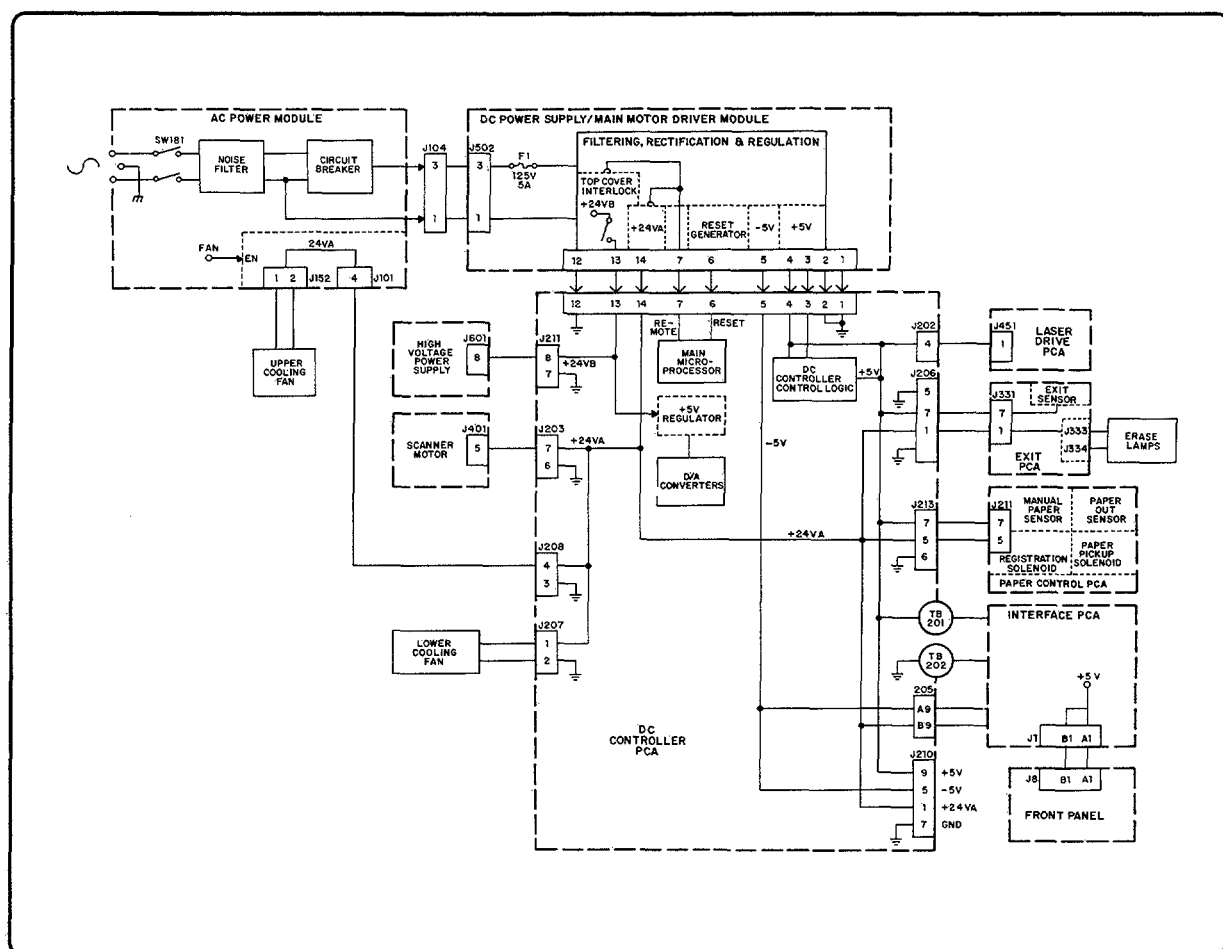


Figure 5-19. DC Power Distribution

REMOVAL AND REPLACEMENT

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6-1. INTRODUCTION

General

The service philosophy for the HP 33440 and HP 33449 printers centers on the modular-level replacement of electro-mechanical assemblies and some associated components as well as the assembly-level replacement of printed circuit assemblies (PCAs). No attempt should be made to identify component failures within these assemblies. The components and the procedures for their removal and replacement are essentially the same for both printers. **Unless specifically noted, replacement is the reverse of removal.**

The procedures in this chapter attempt to be as thorough as possible regarding the removal and replacement of specific assemblies with minimal removal of other components. Figures in Chapter 8, although not generally referenced, will also be found to be useful. The service representative should use these procedures as a guide to build familiarity with the replaceable components of both printers. In referring to the orientation of the various assemblies, the *front* of the printer is the Control Panel/Paper Tray end.

Caution



Power-off the printer by disconnecting the power cord from the power source and remove the EP-S Cartridge before attempting to disassemble the printer. Also allow time for the Fusing Assembly components to cool before handling.

Tools Required

- Magnetic Phillips No. 2 screwdriver with minimum 4-inch shaft.
- Needle-nose pliers.
- Small flat-blade screwdriver.
- Antistatic safeguards.

Caution


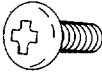

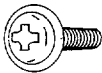



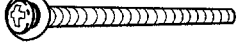


Most PCAs (Printed Circuit Assemblies) contain components that are sensitive to damage by electrostatic discharge. When you remove, install, or handle any of these assemblies, be sure to use protective measures including static-free workstations and personal grounding devices such as the antistatic wrist strap and grounding mat included in the *Electrically Conductive Field Service Grounding Kit* (HP 9300-0933). Follow all recommended antistatic procedures.

Hardware Review

In the removal procedures which follow in this chapter, numbers inside parentheses – (2) for example – refer to the number of fasteners to be removed. Pay careful attention to the type of screw removed; always replace it in the same location. The following table presents usage guidelines for the principal screw types used in the HP 33440 and HP 33449 printers.

Table 6-1. Types of Fasteners

Example	Type	Use
	Coated (black) pan-head Phillips machine screw.	Fastening metal or plastic to metal or metal inserts.
	Plated (silver-colored) pan-head Phillips machine screw.	Fastening metal to metal.
	Coated (black) washer-head Phillips machine screw.	Fastening plastic or metal to metal or a metal insert when a washer is required.
	Plated (silver-colored) washer-head Phillips machine screw.	Fastening metal to metal when a washer is required. Also used as cover screws.
	Coated (black) self-tapping Phillips screw for plastic.	Attaching plastic parts to a plastic casting when self-tapping is required.
	Plated (brass-colored) Phillips shoulder screw.	Attaching Fusing Assembly cover and Fuser Insulating Covers.
	Plated (silver-colored) Phillips screw with captive star washer.	Fastening metal to metal where ideal ground or voltage contact is required.
	Long, brass-colored screw with lock washer and flat washer.	Laser/Scanning Assembly.

Caution



Use of a pozidrive screwdriver may strip the screw head. The HP 33440 and HP 33449 printers use only No. 2 Phillips screws. Use the proper screwdriver when working with these fasteners. To retain RFI certification, *all* screws must be replaced in their original locations and tightening snugly.

Component Location and Identification

Since the location of major external components is similar for both printers, only the HP 33440 is shown here. For component location and identification information using HP 33449 illustrations, see Chapter 1, Section 1-6.

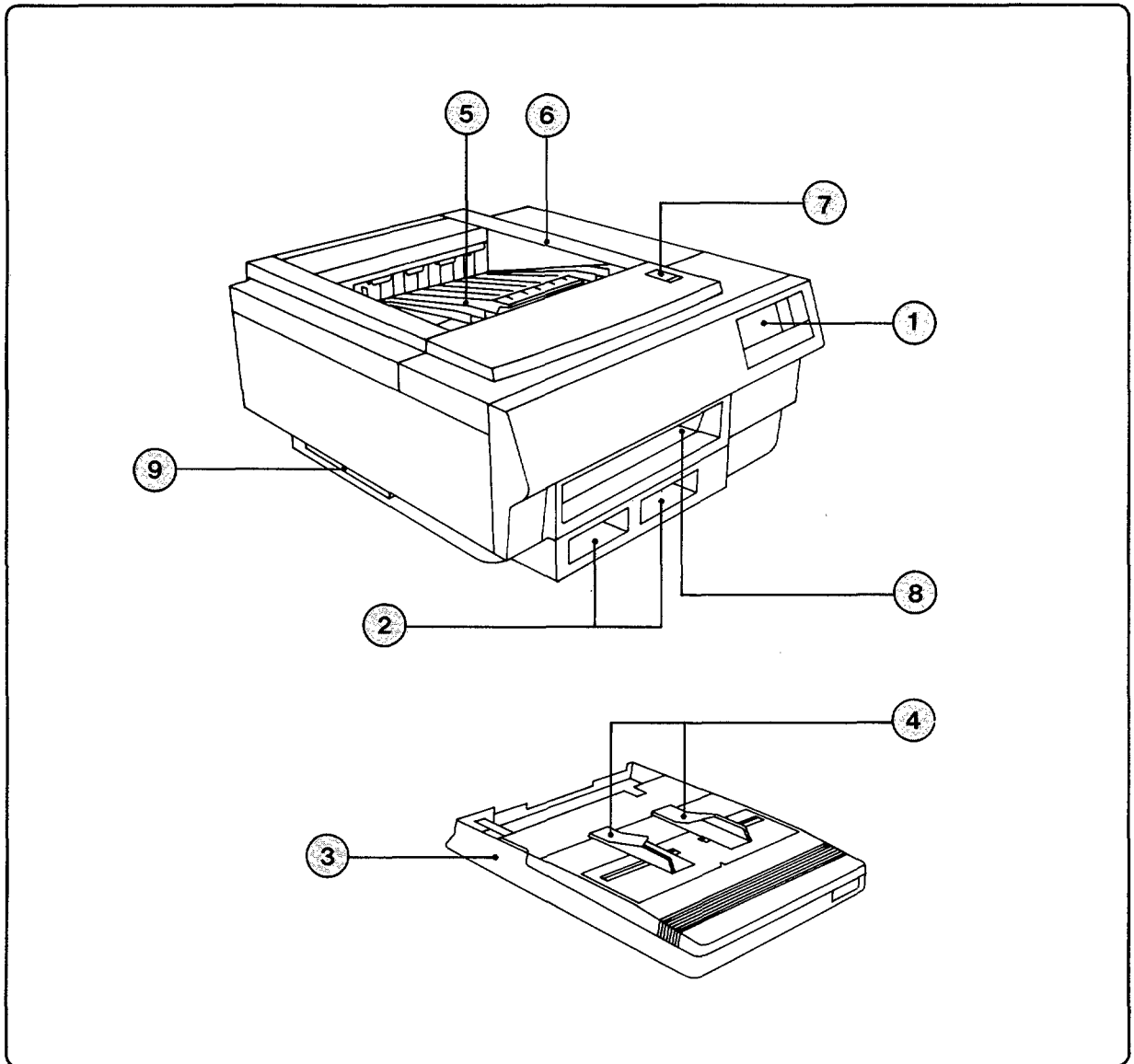


Figure 6-1. Front View

- | | |
|--------------------------|---|
| 1. Control Panel | 5. Top Cover Assembly (Hinged) |
| 2. Cartridge Slots | 7. Top Cover Release Button |
| 3. Paper Tray (Letter) | 8. Paper Tray Slot |
| 4. Manual Feed Guides | 9. Expansion Memory Slot(s) (Under cover: |
| 5. Face-Down Output Tray | 1 on HP 33440, 2 on HP 33449) |

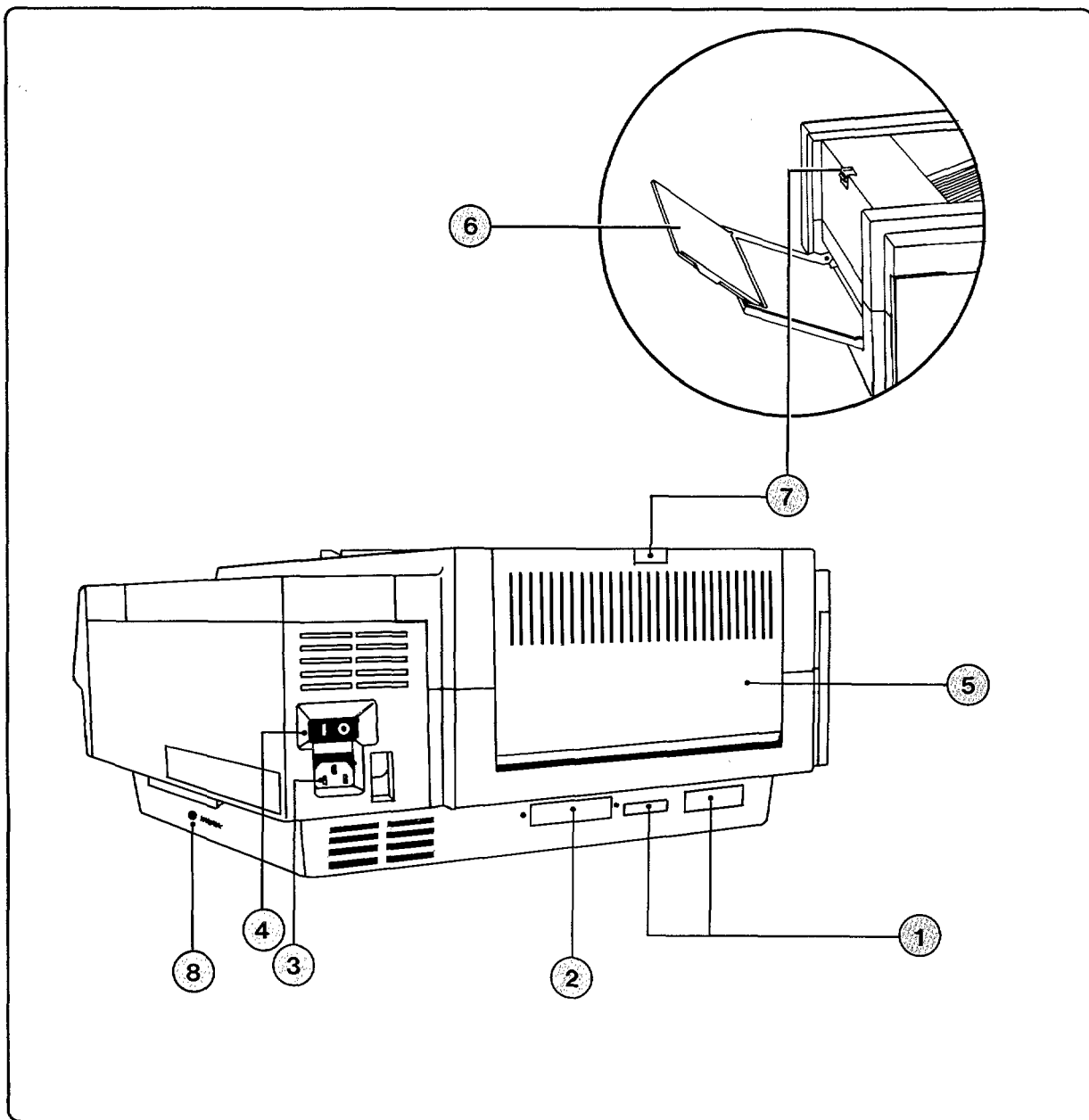


Figure 6-2. Rear View

- | | |
|--|---|
| 1. Serial and Parallel I/O Ports | 6. Face-Up (Rear) Output Tray (Open) |
| 2. Optional I/O Slot | 7. Face-Up (Rear) Output Tray Latch
(Pressure-release latch on HP 33449) |
| 3. Power Connector | 8. Test Print Button (Under cover
on HP 33449) |
| 4. Power Switch | |
| 5. Face-Up (Rear) Output Tray (Closed) | |

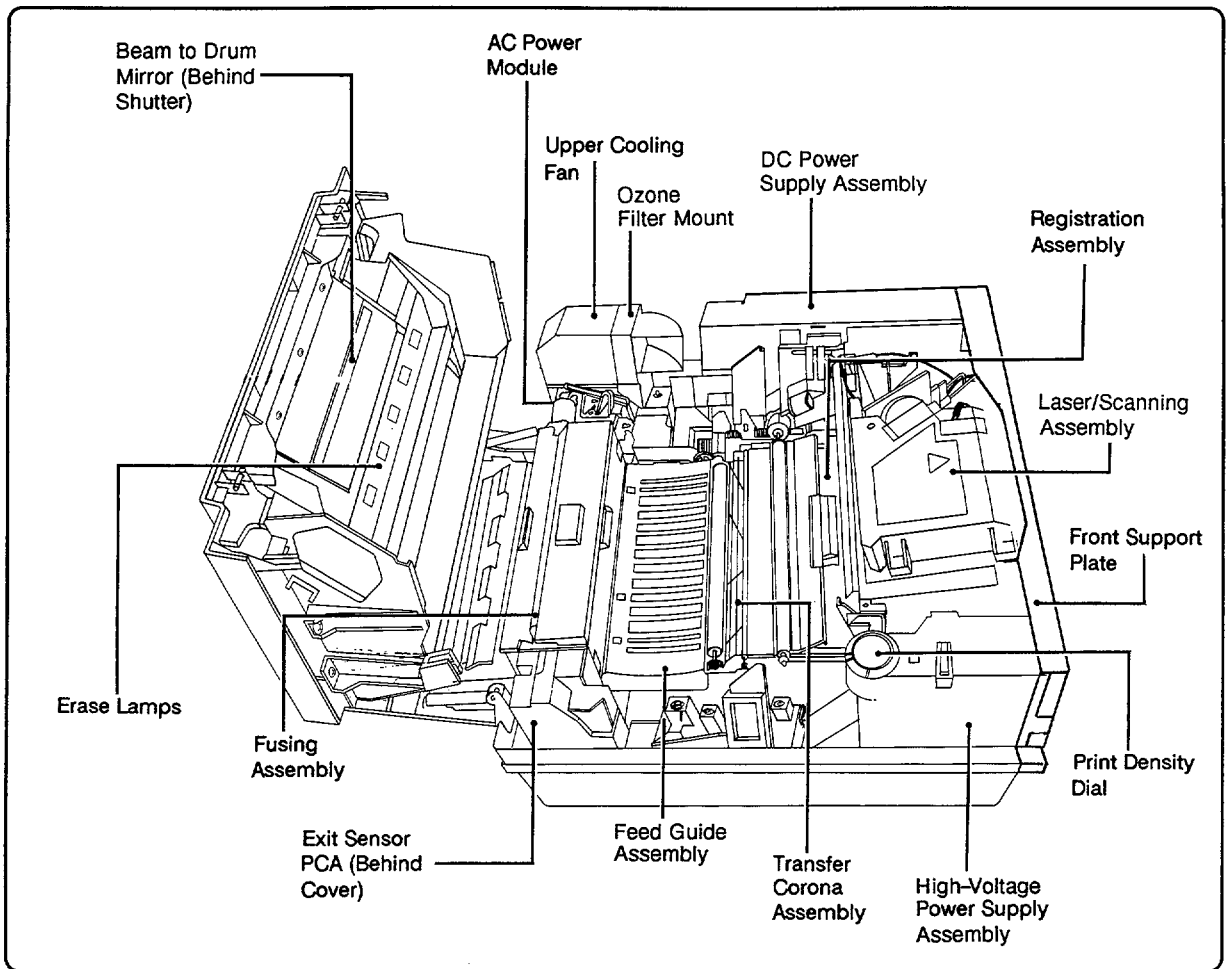


Figure 6-3. Interior View with Covers Removed

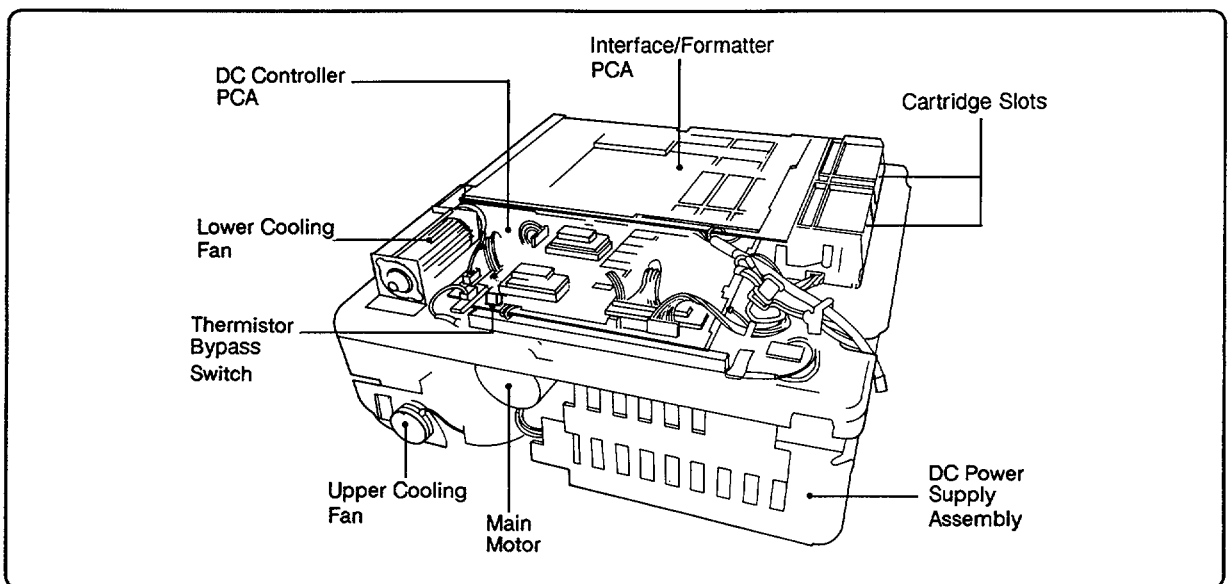


Figure 6-4. Bottom View

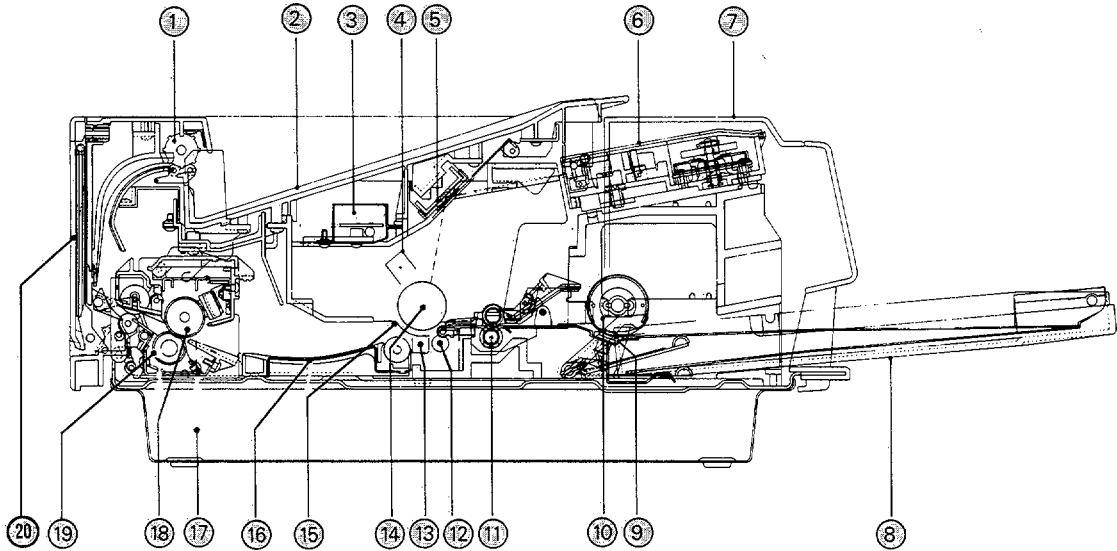


Figure 6-5.
Internal Printer Components
(HP 33440 shown, but all internal
parts are essentially identical)

- | | |
|----------------------------|----------------------------------|
| 1. Delivery Assembly | 11. Registration Rollers |
| 2. Face-Down Tray | 12. Transfer Corona Roller |
| 3. Erase Lamp Assembly | 13. Transfer Corona Assembly |
| 4. Primary Corona | 14. Photosensitive EP Drum |
| 5. Beam-to-Drum Mirror | 15. EP Drum Protective Shield |
| 6. Laser/Scanning Assembly | 16. Feed Guide Assembly |
| 7. Main Body Covers | 17. Lower Main Body |
| 8. Paper Tray | 18. Upper Fusing Roller |
| 9. Separation Pad | 19. Lower Pressure Roller |
| 10. Feed Roller Assembly | 20. Face-Up Output Tray (Closed) |

6-2. COVERS, PANELS, AND ASSOCIATED PARTS

General

This section describes removal of the Main Body Covers and related parts which allow access to the Main Body components described in Section 6-3. Access to components within the hinged Top Cover Assembly or encased within the bottom cover(s) are described later in this section.

Main Body Covers

Warning



Remove the EP-S Cartridge and Paper Tray and unplug the printer from its power source before proceeding with any removal procedures.

HP 33440 Printer

1. Remove the power cord from the printer's receptacle, the paper tray, and any font cartridges.
2. Remove screws (8) securing the Main Body Covers Assembly (see Figure 6-6).
3. Remove the cover by lifting the entire assembly slightly and rotating the rear of the cover up and toward the Control Panel. Use caution to avoid damage to the Control Panel and cables.
4. Disconnect the Control Panel connector by pushing the plastic latches outward, then unseating the connector.
5. The Main Body Covers Assembly may be further disassembled if required.

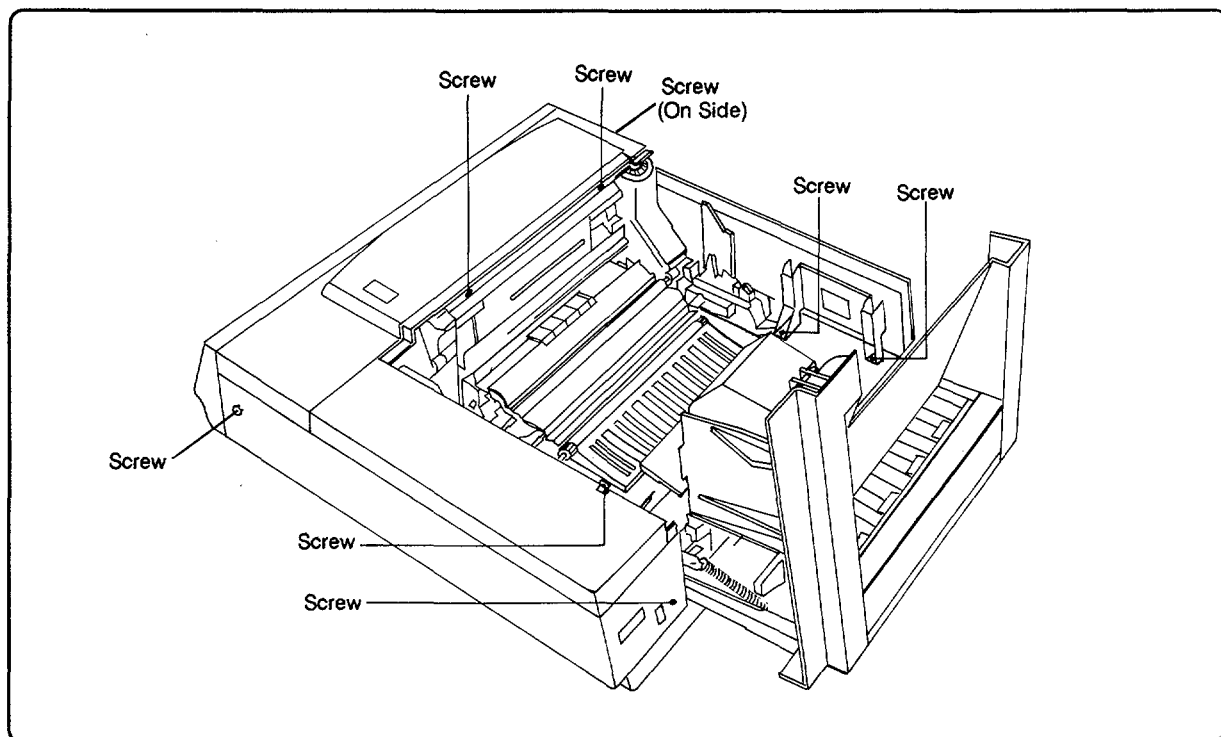


Figure 6-6. HP 33440 Main Body Covers Assembly

HP 33449 Printer

It is recommended that the four interlocking cover panels that form the HP 33449 Main Body Covers be removed one at a time as described below (see Figure 6-7). Structural damage can occur if the assembly is removed as a unit.

Caution



Since the printer's model and serial number are permanently attached to the Fan Guide portion of the right side cover panel, be sure to put the panel back on the printer from which it was removed. If the right side cover panel must be replaced, the Fan Guide panel containing the model and serial number must be transferred to the new right side cover panel.

1. Remove the power cord from the printer's receptacle.
2. To remove the top cover panel of the Main Body Covers, open the hinged Top Cover Assembly and remove the screws (3) securing the top cover panel, then push in on the *right side cover panel* at the points shown in Figure 6-7. Rotate the rear of the top cover panel to vertical before lifting it off.
3. Remove the right side cover panel by removing the screws (2) – one at the rear next to the Power Switch and one attaching it to the front cover panel – and lifting it vertically out of the printer. Note that the Fan Guide panel (Power Switch area) which contains the model and serial number plate can be detached from the right side cover panel (see following).
4. Remove the left side cover panel by removing the screws (3) – two attaching it to the base plate and one attaching it to the front cover panel – and lifting it vertically out of the printer. Be careful to keep the front cover panel from falling. (**Hint:** Leave the paper tray installed to hold the front cover panel in place.)
5. Detach the Control Panel Cable connector by pushing the plastic latches outward, then unseating the connector.
6. Remove the front cover panel. *Use caution to avoid damage to the Control Panel.*

When replacing the front cover panel, its lower lip must slip under the plastic rim of the base cover panel. The three tabs on the front edge of the top cover panel must fit into the slots on the front cover panel before rotating the top cover panel into place (see Figure 6-8).

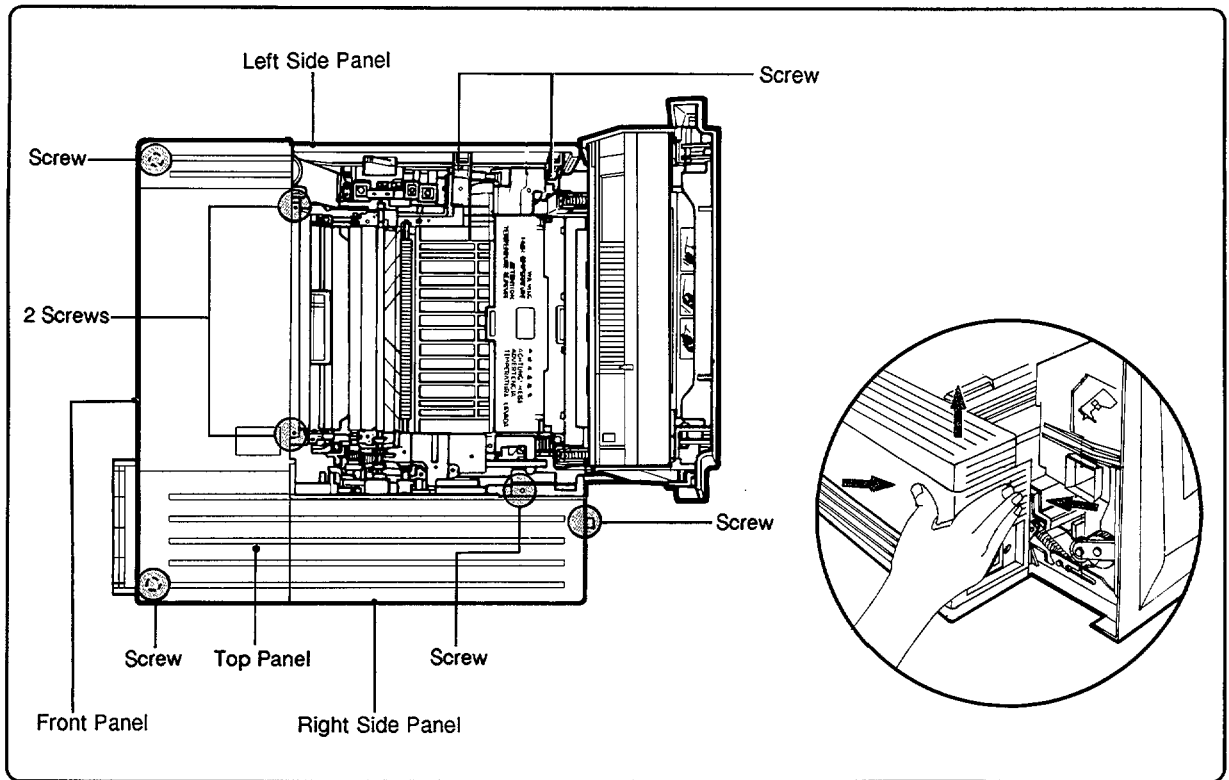


Figure 6-7. HP 33449 Main Body Covers

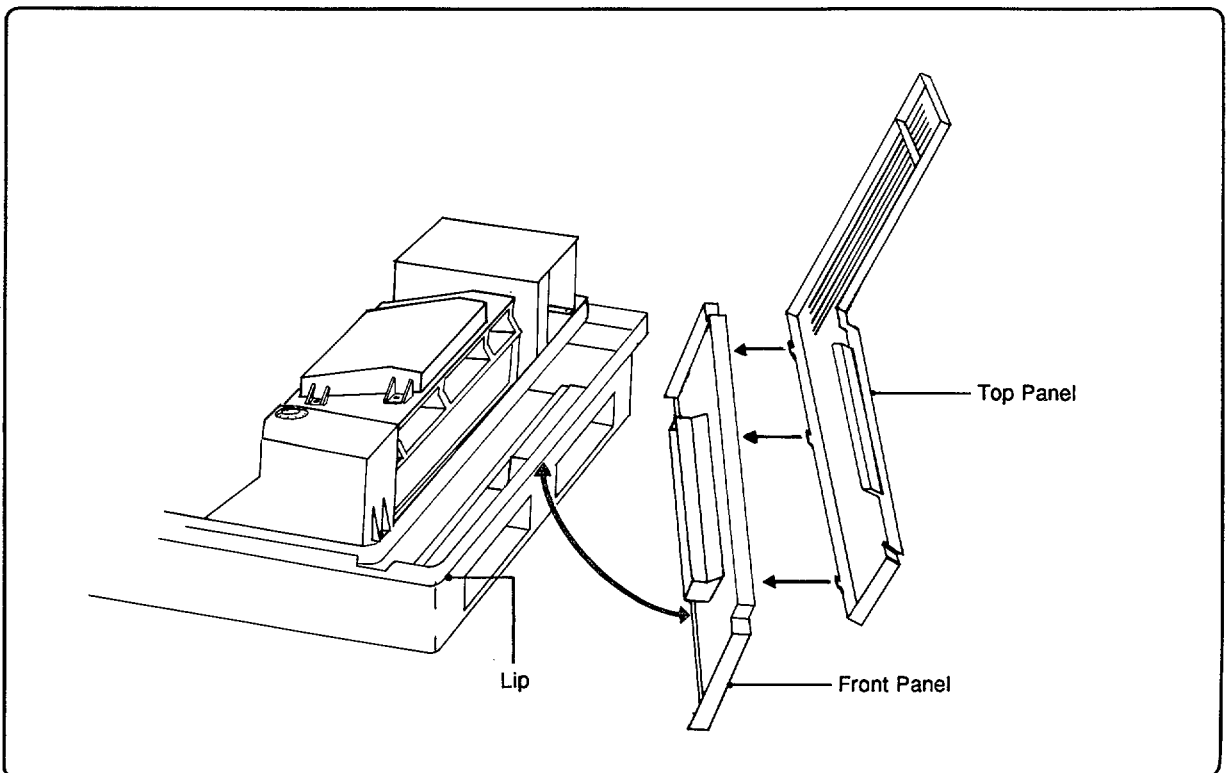


Figure 6-8. HP 33449 Front and Top Cover Panel Replacement

HP 33449 Fan Guide (Serial Number Plate)

Since the HP 33449's model and serial number label is affixed to the right cover panel assembly, it will need to be moved to the new cover panel assembly in the event the original panel is damaged. To perform this, refer to Figure 6-9 and proceed as follows:

1. Remove the top cover panel (3), then the right cover panel (2) of the Main Body Covers.
2. Remove the black self-tapping screws (2) securing the Fan Guide to the right cover panel.
3. Lift the Fan Guide slightly and slide it out of its positioning pin retainers on the right cover panel.

Since the Fan Guide is held in position with self-tapping screws, be careful not to create a new set of threads in the plastic when reinserting the screws.

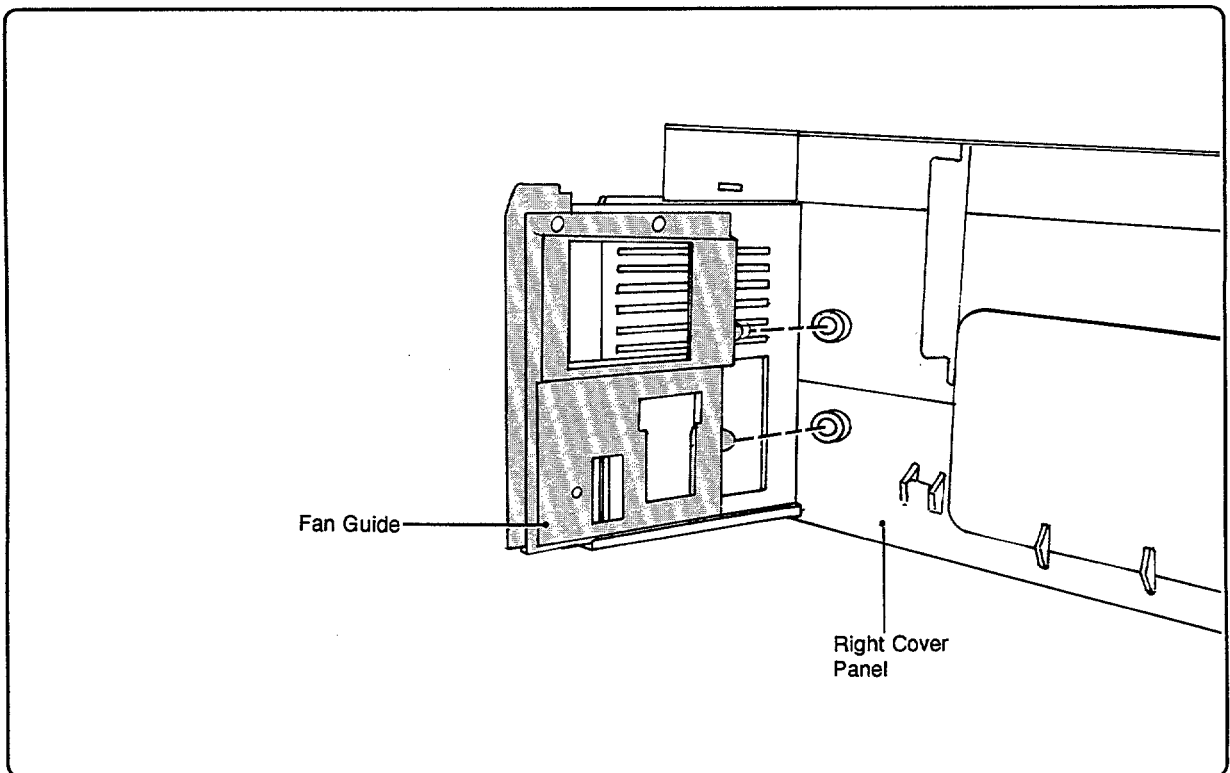


Figure 6-9. Fan Guide Removal

Control Panel

1. Remove the Main Body Covers.
2. Remove the screws (4) securing the Control Panel to the front cover panel (see Figure 6-10).

HP 33449 only: When replacing the Control Panel, be sure the keys do not bind on the front cover panel surfaces.

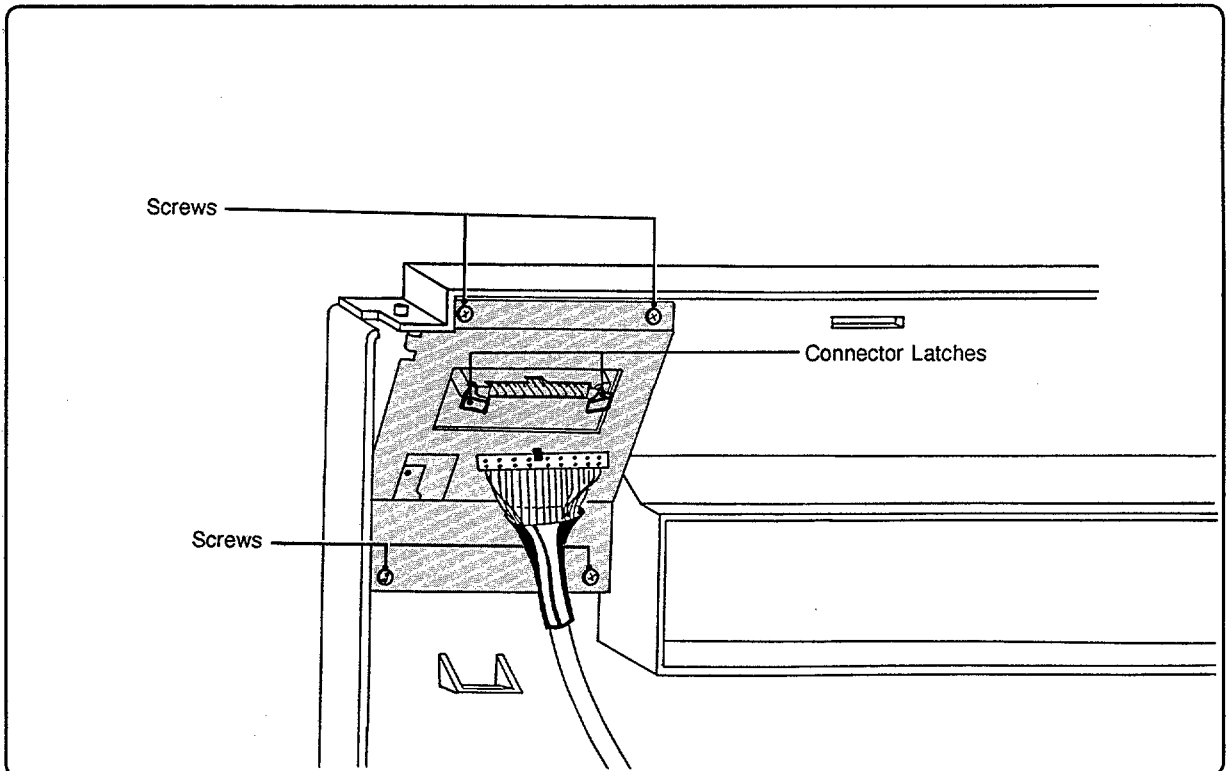


Figure 6-10. Control Panel Removal

Front Support Plate

The Front Support Plate (shown in Figure 6-11) must be removed before most of the components at the front end of the printer can be accessed.

1. Remove the Main Body Covers.
2. Disconnect the ground wire screw (1) and cable restraint connected to the plate.
3. Remove the screws (6) securing the plate to the printer.
4. Carefully lift the plate slightly and to the right to avoid snagging the Laser/Scanning Assembly cables. Be particularly careful of the fiber optic cable.

Be sure to replace the cable restraint as shown in Figure 6-11 to ensure cables are properly routed.

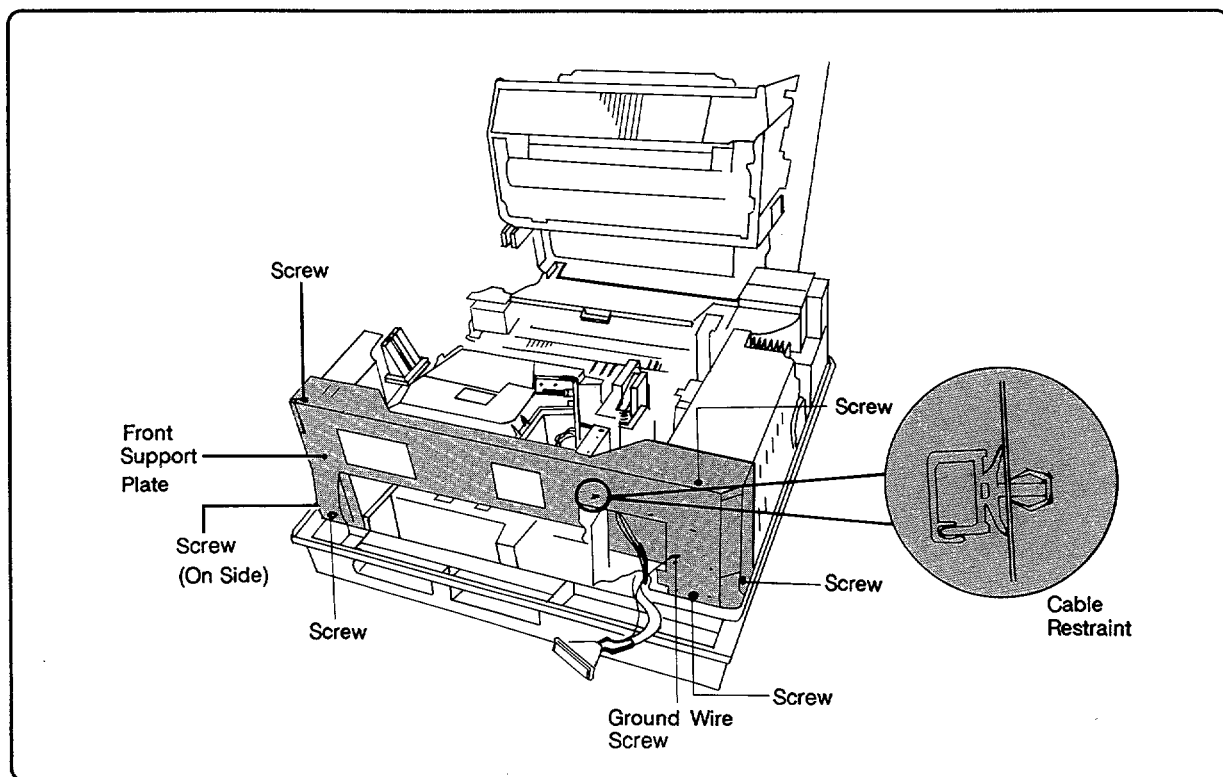


Figure 6-11. Front Support Plate

Miscellaneous Covers

Two protective covers, the Exit Sensor PCA Cover (1) and the Main Motor Drive Gears Cover (1), located inside the printers (see Figure 6-12) can be removed to facilitate access to other components. Note the position of each of these covers and replace them when servicing is complete.

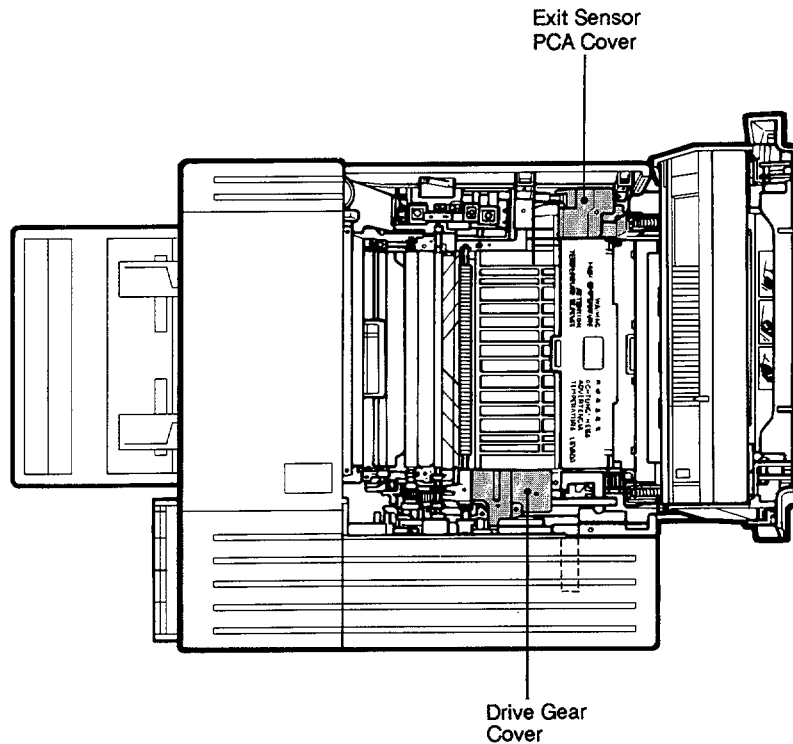


Figure 6-12. Miscellaneous Covers

Upper and Lower Face-Up (Rear) Output Tray Doors

The upper and lower Face-Up (Rear) Output Tray doors can be removed by depressing their sides and lifting the hinge pins out of their slots (see Figure 6-13). It may be necessary to use a small flat-blade screwdriver to aid in releasing the doors. *Use caution: too much pressure may cause damage.*

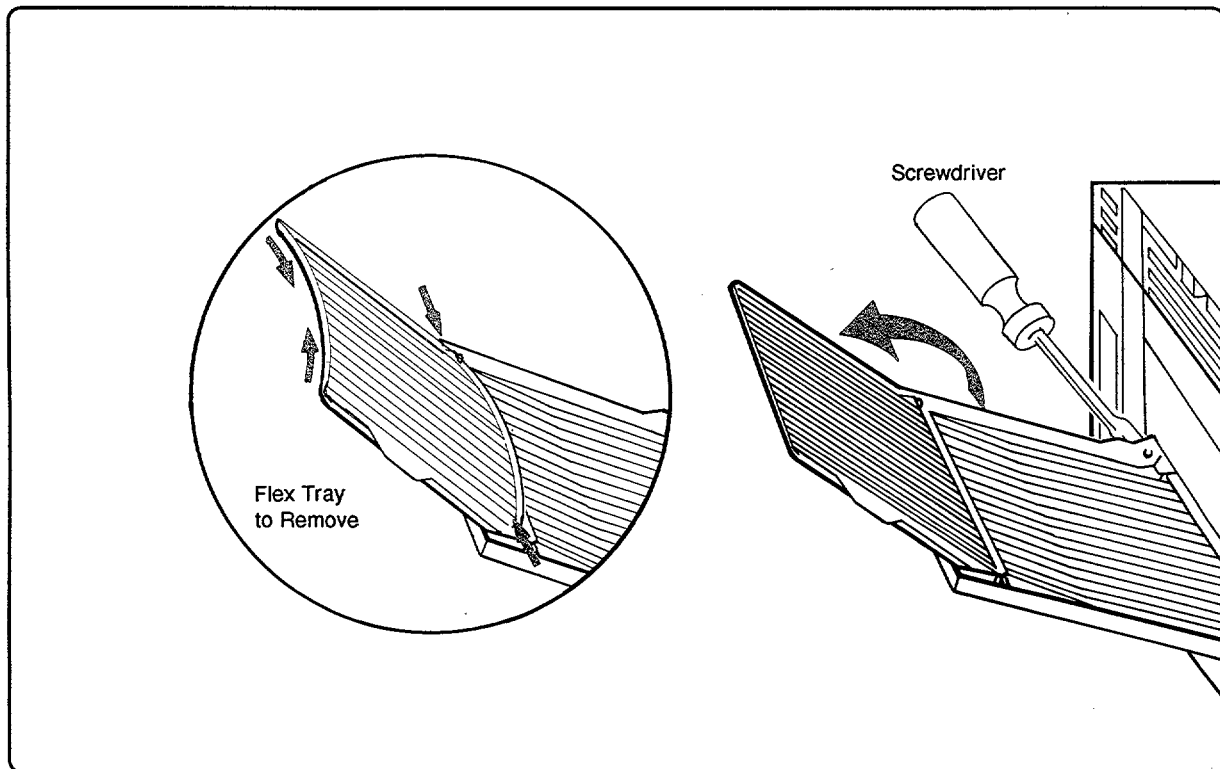


Figure 6-13. Face-Up Output Tray Doors

Cover Release Button

The Top Cover Assembly Release Button, attached to the Main Body Covers' top cover panel, can be replaced on the HP 33440 by detaching the spring and lifting the button out. For the HP 33449, the latch button can be removed by squeezing the mounting arms together and lifting it out.

6-3. MAIN BODY COMPONENTS

OZONE FILTER MOUNT

The Ozone Filter is contained in the Ozone Filter Mount shown in Figure 6-14. The entire AC Power Module does not need to be removed to remove the Ozone Filter, but the fan duct may need to be removed in the HP 33440 (see note below). On the HP 33449 and later or modified models of the HP 33440, follow the directions on the Ozone Filter Access Door for filter removal. To remove the Ozone Filter Mount in both printers:

1. Remove the Main Body Covers.
2. Remove the screws (2) securing the filter mount and lift straight out.
3. Slide the filter out of its mount.

Note



A user-replaceable Ozone Filter is standard in the HP 33449 and can be installed as an option in the HP 33440. See Service Note 33440-7.

Warning



When replacing the Ozone Filter Mount, ensure that the circuit breaker reset button is positioned in the center of the cover access hole. Failure to position the Ozone Filter Mount properly may cause a safety issue.

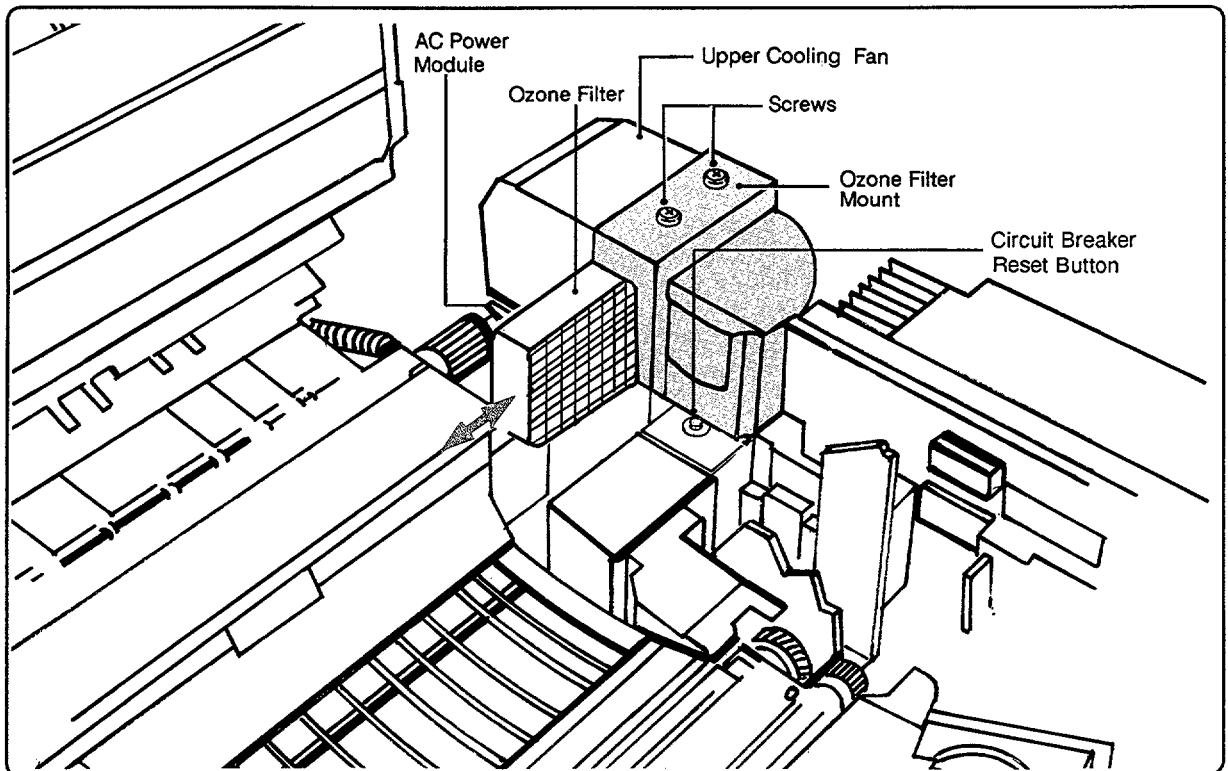


Figure 6-14. Ozone Filter Mount

UPPER COOLING FAN

1. Remove the Ozone Filter Mount as described above.
2. To remove the Upper Cooling Fan, which rests on the AC Power Module (see Figure 6-15), remove the connector and the screws (3) that secure it to the module.

Ensure the Upper Cooling Fan wires are routed properly before securing the Ozone Filter Mount.

AC POWER MODULE

Warning



Disconnect the Power Cord from the printer prior to servicing the AC Power Module. Also allow time for the Fusing Assembly to cool before attempting to service this portion of the printer.

The AC Power Module, located below the Upper Cooling Fan, is shown in Figure 6-15. The Circuit Breaker is located at the frontmost end of the AC Power Module beneath the Ozone Filter Mount.

1. **Disconnect the Power Cord from the Printer.**
2. Remove the Main Body Covers.
3. Remove the Fusing Assembly (4) and the Ozone Filter Mount (2).
4. Remove the silver-colored screws (4) that secure the AC Power Module to the printer base plate, and remove the module from the printer, being careful not to damage the large pin connectors attaching the module to the base connectors.

Caution



To prevent damage to the unit, ensure that the large pin connectors are properly aligned when reinstalling the AC Power Module. Also ensure the screw with the captive star washer is properly reinstalled at the rear of the printer.

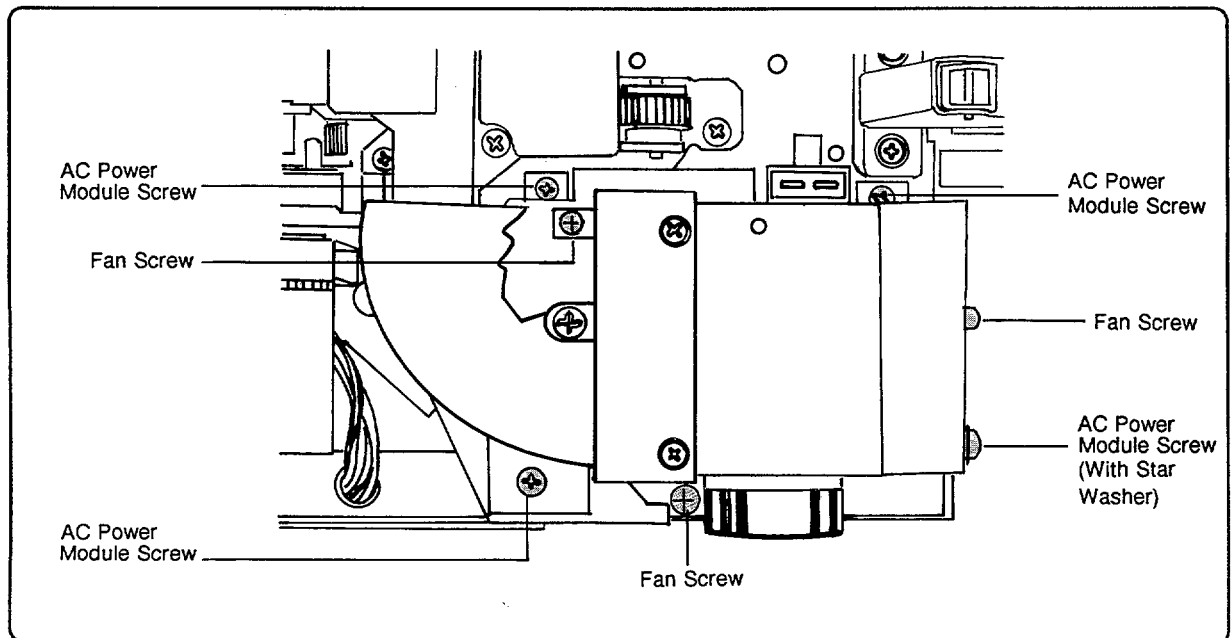


Figure 6-15. AC Power Module and Upper Cooling Fan

MAIN MOTOR AND DRIVE ASSEMBLIES

The location of the Main Motor and Drive Assemblies is shown in Figure 6-16. The disassembly procedures described below (Main Motor, 57- and 19-Tooth Gears, and Feed Drive Assembly) need to be performed in sequential order.

Main Motor and Drive Assembly

1. Remove the Main Body Covers and Front Support Plate.
2. Remove the plastic Gear Cover (1) (optional: unit can be removed with Gear Cover attached).
3. Remove the Ozone Filter Mount, Fusing Assembly, and AC Power Module.
4. Disconnect the Main Motor connector from the DC Power Supply Assembly and unfasten the Fiber Optic Cable from its retaining clip. Then remove the DC Power Supply Assembly (3).
5. Remove the screws (5) that secure the Main Motor and Drive Assembly to the printer frame and remove the assembly.
6. Remove the screws (4) that connect the motor to the Drive Assembly and separate the units.
Do not attempt to replace individual gears; the entire Drive Assembly should be replaced if any part becomes damaged.

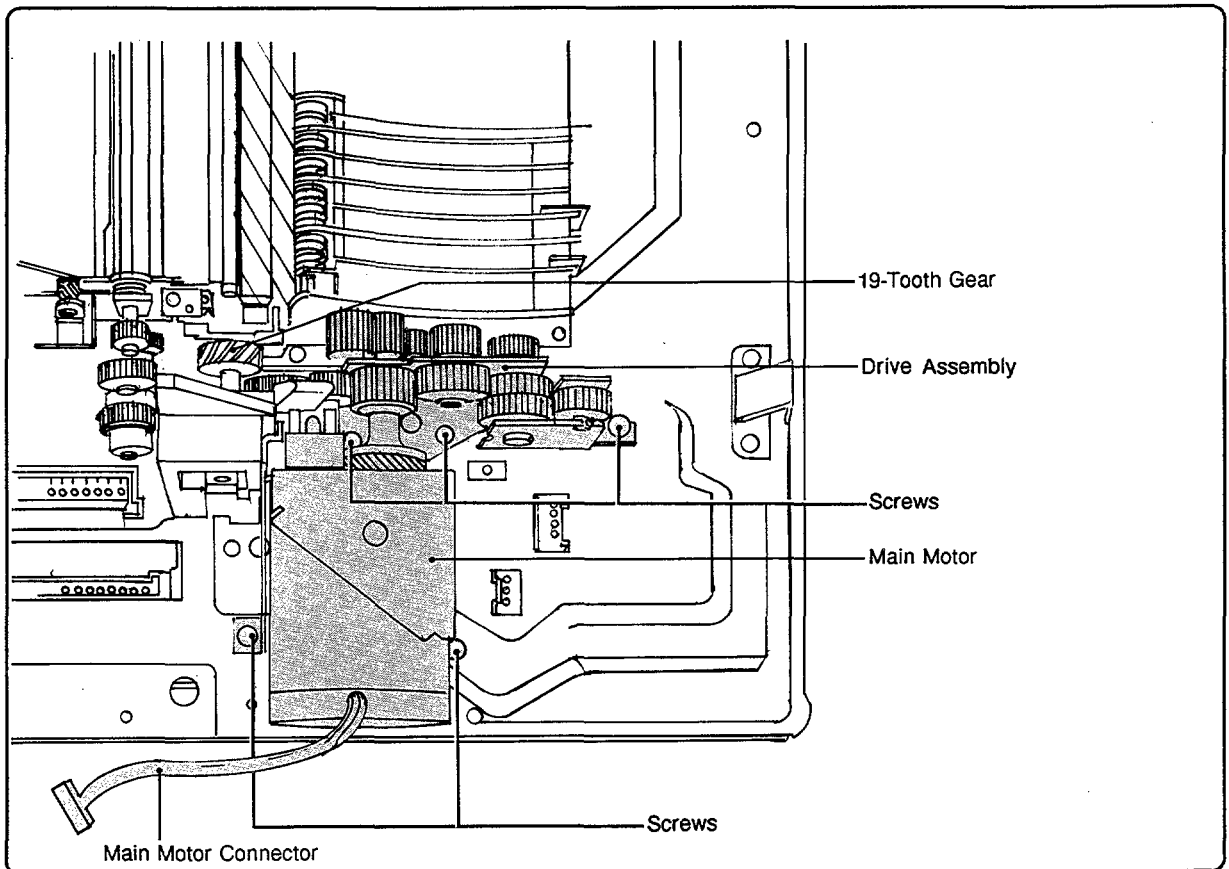


Figure 6-16. Main Motor and Drive Assembly

57- and 19-Tooth Gears and Drum Drive Shaft

Before the 57- and 19-Tooth Gears (located at the ends of the Drum Drive Shaft) can be removed (see Figure 6-17), several adjacent assemblies must be removed.

1. After removing the Main Motor Assembly (above), remove the High-Voltage Power Supply Assembly, Registration Assembly, and Transfer Corona Assembly.
2. Use needle-nose pliers or a small flat-blade screwdriver to remove the C-clip from the left (inside) end of the (drum drive) gear shaft.
3. Pull the bearing off the left end of the shaft.
4. Pull the shaft out the right side opening, letting the gears drop off the shaft. Since the gears and shaft are keyed, they may have to be rotated to remove the shaft.

When replacing the gears, note that the 19-Tooth Gear can only be installed in one direction. The 57-Tooth Gear can be installed on the shaft either way.

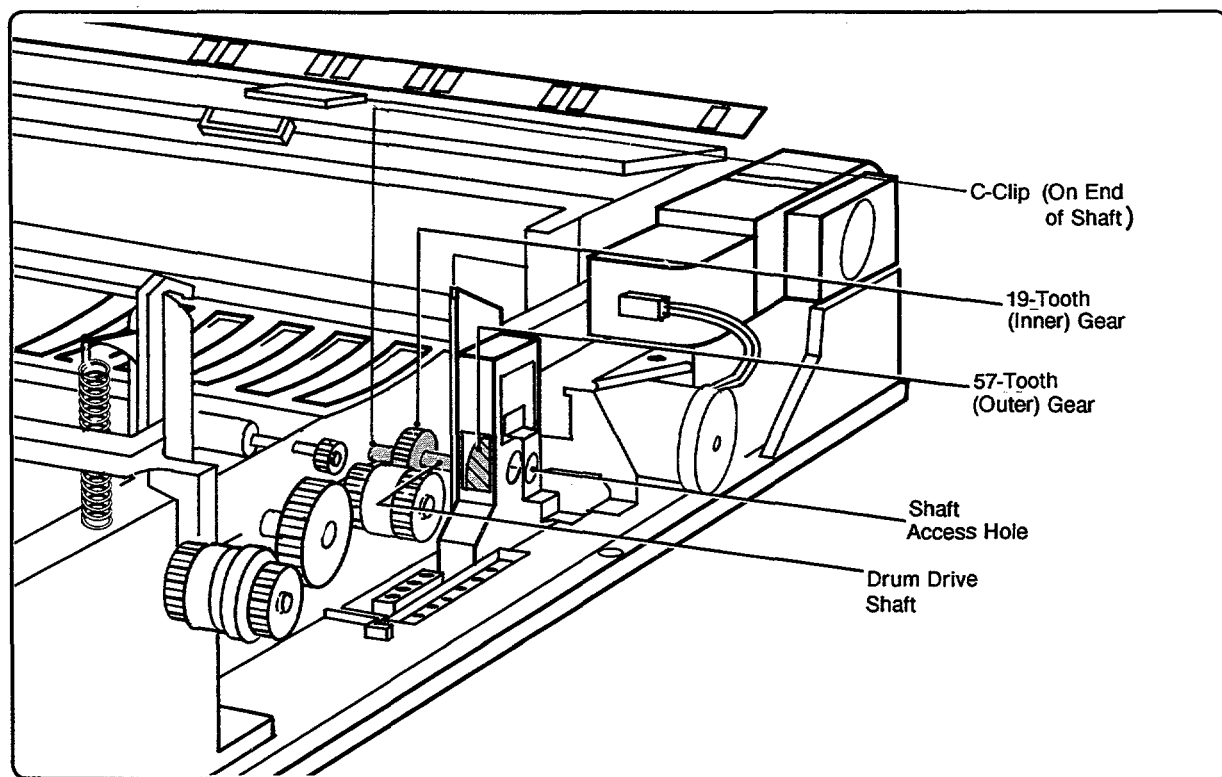


Figure 6-17. 57- and 19-Tooth Gears and Drum Drive Shaft

Feed Drive Assembly

The Feed Drive Assembly is shown in Figure 6-18.

1. Remove the Main Motor and Drive Assembly and the 57- and 19-Tooth Gears and Drive Shaft as described above.
2. Remove the right side Feed Roller Assembly mounting screw (1) and carefully push the right end of the assembly out of the way to access the front-most Feed Drive Assembly mounting screw.
3. Remove the screws (3) securing the Feed Drive Assembly and lift out.

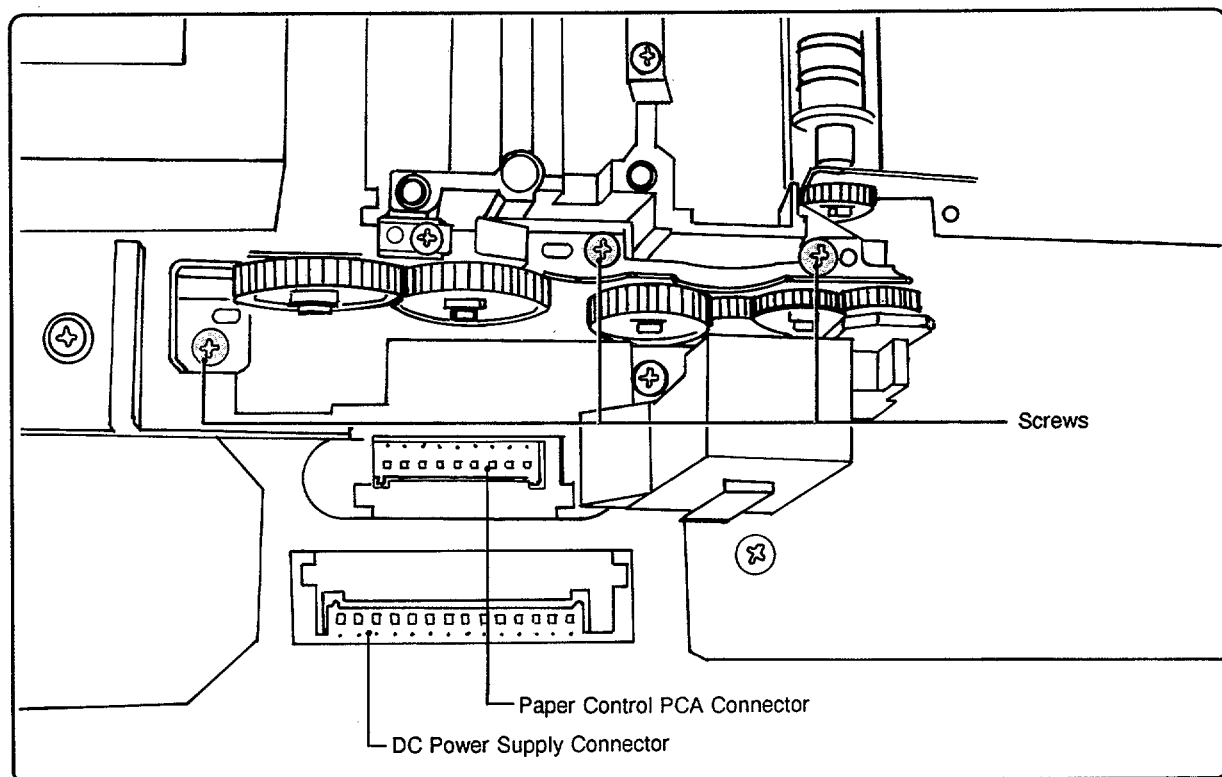


Figure 6-18. Feed Drive Assembly

DC POWER SUPPLY ASSEMBLY

The DC Power Supply Assembly contains the Main Motor driver circuitry as well as the DC Power Supply fuse. The Paper Control PCA attaches to it.

DC Power Supply Fuse

1. Remove the Main Body Covers and Front Support Plate.
2. Remove the DC Power Supply Fuse (located in the lower left front corner of the DC Power Supply Assembly (see Figure 6-19). Be sure to replace this fuse with one of the proper value.

DC Power Supply Assembly

Caution



Since the Paper Sensing Arm can be easily damaged, take care when removing the DC Power Supply. Also remove the Fiber Optic Cable from its retaining clip to prevent damage to the cable. Remove the Main Motor connector as well.

1. Remove the Main Body Covers and Front Support Plate.
2. Remove the screws (3) securing the DC Power Supply Assembly, disconnect the Main Motor connector, and remove the Fiber Optic Cable from its retaining clip.
3. Lift the assembly straight up and out, taking care not to damage the Paper Sensing Arm. This may require a firm lifting action combined with a front-to-back rocking action because of the three large pin connectors which secure the assembly to the base plate.
4. Remove screws (6) to separate the DC Power Supply Assembly from the Paper Control PCA.

Use caution when replacing the assembly to ensure the connectors are properly aligned before securing it to the base plate. Be sure to install the mounting screw with star washer at its proper location at the rear of the assembly (see Figure 6-19).

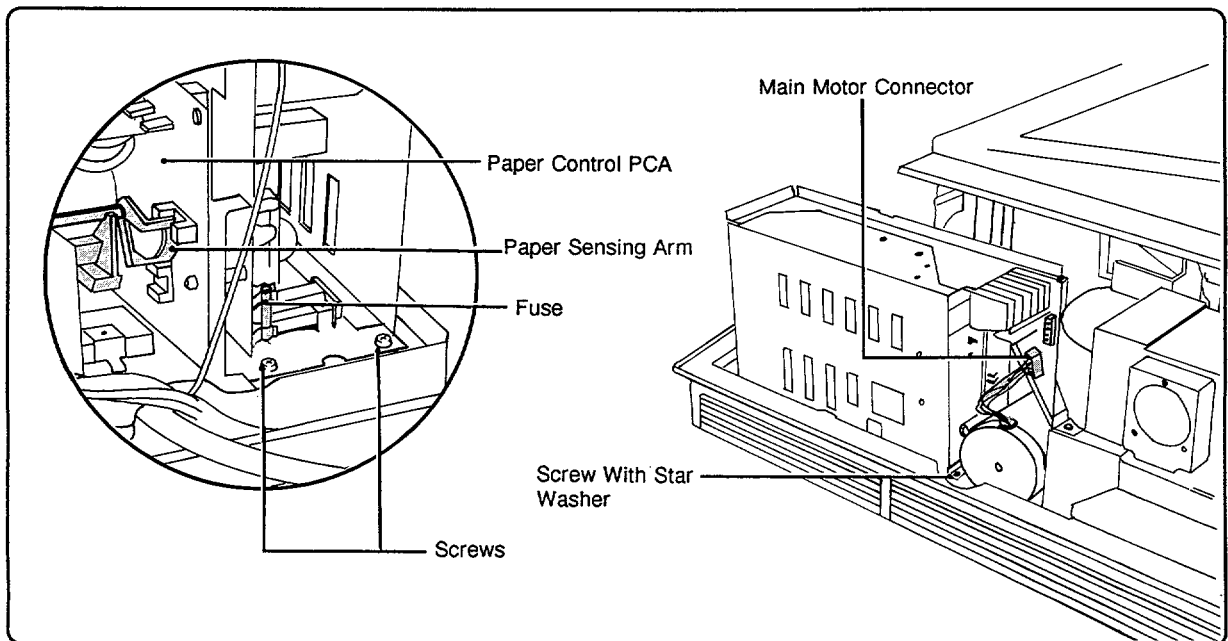


Figure 6-19. DC Power Supply Assembly

PAPER CONTROL PCA

Figure 6-20 shows the location of the Paper Control PCA.

1. Remove the Main Body Covers, Front Support Plate, and DC Power Supply Assembly.
2. Remove the Paper Control PCA cover (1).
3. Remove the screws (6) that secure the Paper Control PCA to the DC Power Supply Assembly (see Figure 6-20).

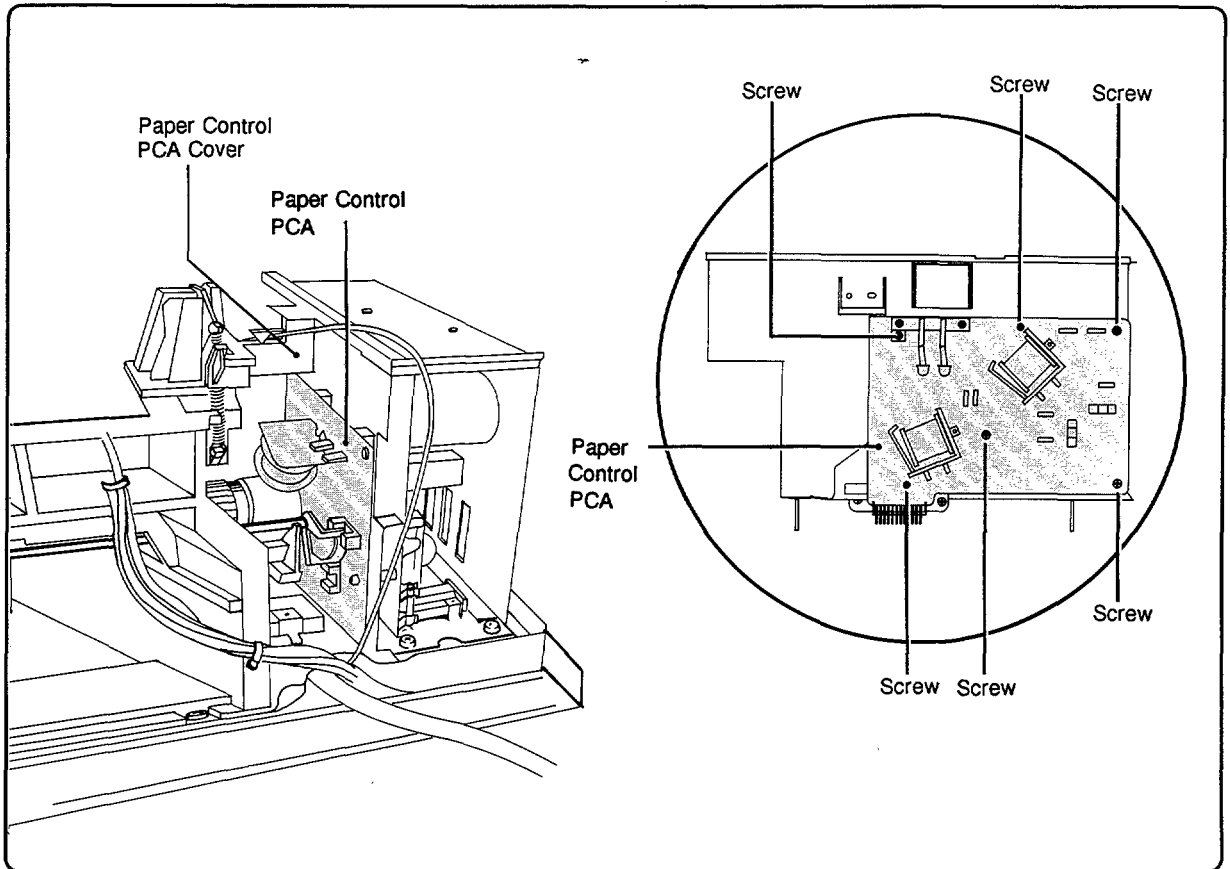


Figure 6-20. Paper Control PCA Removal

HIGH-VOLTAGE POWER SUPPLY ASSEMBLY

The High-Voltage Power Supply (HVPS) and the HVPS Connector must be removed and replaced as a unit.

1. Remove the Main Body Covers and the Front Support Plate.
2. Remove the screws (2) that secure the High-Voltage Power Supply and the screws (2) that secure the High-Voltage Power Supply Connector, and remove the assembly from the printer (see Figure 6-21).

When reinstalling, ensure that the High-Voltage Contact coil springs, located on the underside of the HVPS Connector, are not damaged or contaminated and that the connector pins on the HVPS are properly aligned before seating the assembly. If contacts are dirty, clean them with a cotton swab and isopropyl alcohol.

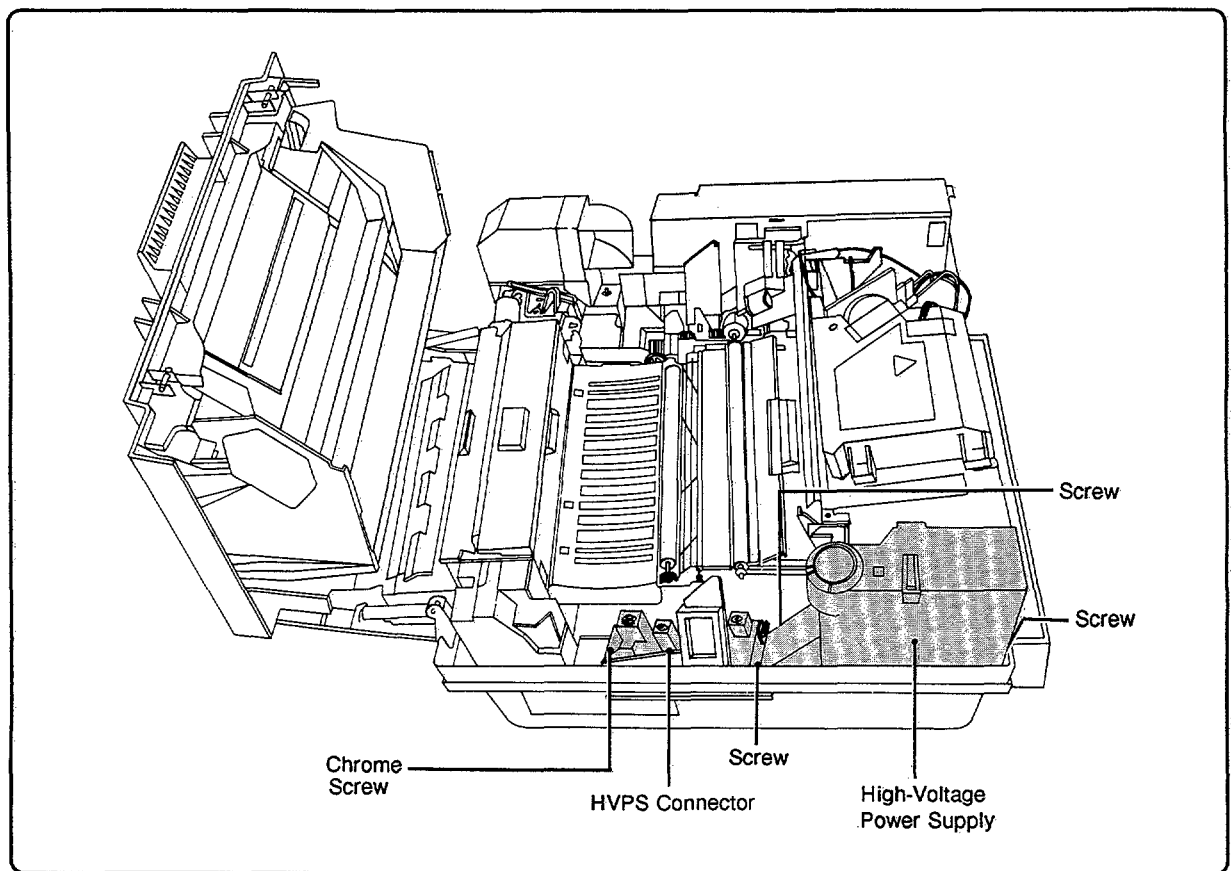


Figure 6-21. High-Voltage Power Supply Assembly

LASER/SCANNING ASSEMBLY

The Laser/Scanning Assembly (Figure 6-22) is extremely fragile and should be handled carefully. Be particularly careful when handling the Fiber Optic Cable.

1. Remove the Main Body Covers. (Only the top cover panel of the Main Body Covers needs to be removed on the HP 33449).
2. Remove the screw (1) on the Fiber Optic Cable connection cover, open the cover, and remove the cable. (Be sure to observe the routing of this cable for exact replacement.)
3. Disconnect cables J401 and J451 on the Laser/Scanning PCA and Laser Driver PCA.
4. Remove the screws (4) that secure the Laser/Scanning Assembly to the printer.
5. Carefully lift the assembly off the frame.

Caution



Some printers have metal shims (plates) located under one or both ends (left or right) of the laser unit. These shims *must not be removed or altered* or the printer may require factory realignment. (See Figure 8-12, Item 41, for shim location.)

FIBER OPTIC CABLE

To *replace* the Fiber Optic Cable, it must be disconnected from both the Laser/Scanning Assembly and the DC Controller PCA.

1. Remove the Main Body Covers. (Only the top cover panel of the Main Body Covers needs to be removed on the HP 33449).
2. To *disconnect* the Fiber Optic Cable from the Laser/Scanning Assembly, remove screw (1) securing the small door (see Figure 6-22), open the door, and slip the cable out of the retainer.
3. To remove it from the DC Controller PCA, remove the Bottom Cover (see Section 6-5) and disconnect the cable.

To prevent damage when reinstalling the cable, be sure it is routed properly with no sharp bends.

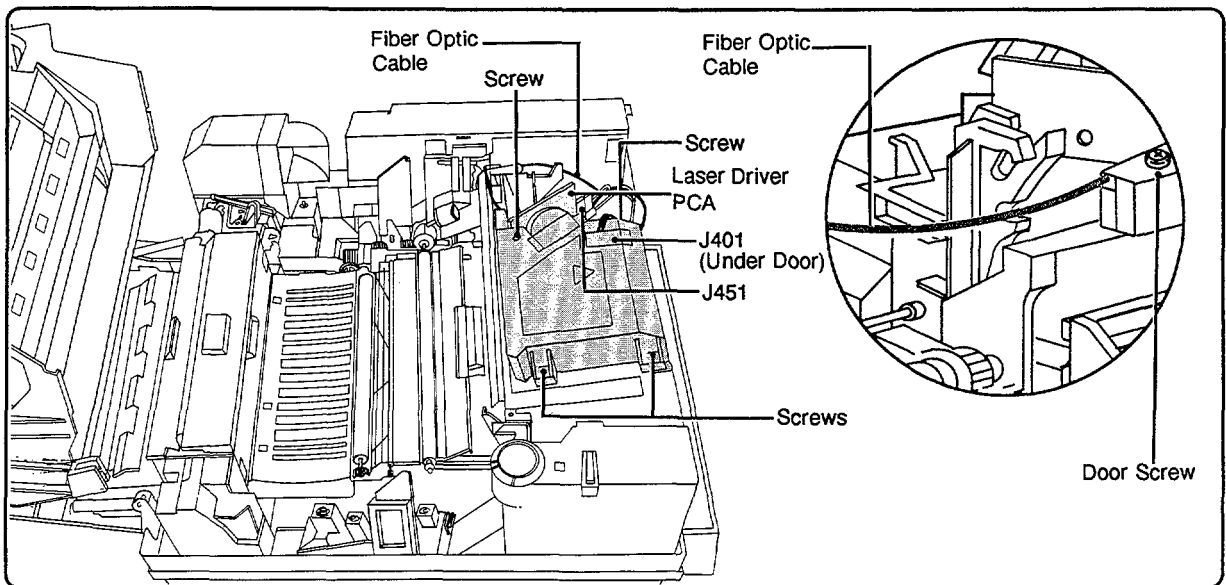


Figure 6-22. Laser/Scanning Assembly

COVER LATCH ASSEMBLY

General

The DC Power Supply Assembly and High-Voltage Power Supply Assembly must be removed to access the Hooks and Guides (see Figure 6-23). Note that the Right and Left Cover Latch Hook assemblies are not interchangeable. The Cover Release Button is discussed in Section 6-2.

Right and Left Cover Latch Hooks

1. Remove the Main Body Covers, Front Support Plate, DC Power Supply Assembly, and High-Voltage Power Supply Assembly.
2. Remove the screw (1) and plate that secures the Right Hook and the screw (1) that secures the Left Hook.
3. Pull the hooks and springs off the shaft, being careful not to lose the springs.

To replace the hooks and springs, slide the spring onto the shaft, slide the hook onto the shaft, secure one end of the spring in its retaining position, and push the hook securely into position. Then move the other end of the spring into its retaining position, as if closing a safety pin. Note that the right and left hook springs are different.

Right and Left Hook Guides

1. Remove the Main Body Covers.
2. Remove the Right and Left Cover Latch Hooks according to the above procedure as needed.
3. Remove the screw (1) that secures each Hook Guide.
4. Lift and slide the Hook Guides off the shaft.

Note that the smaller diameter coil spring is installed on the Left Hook Guide.

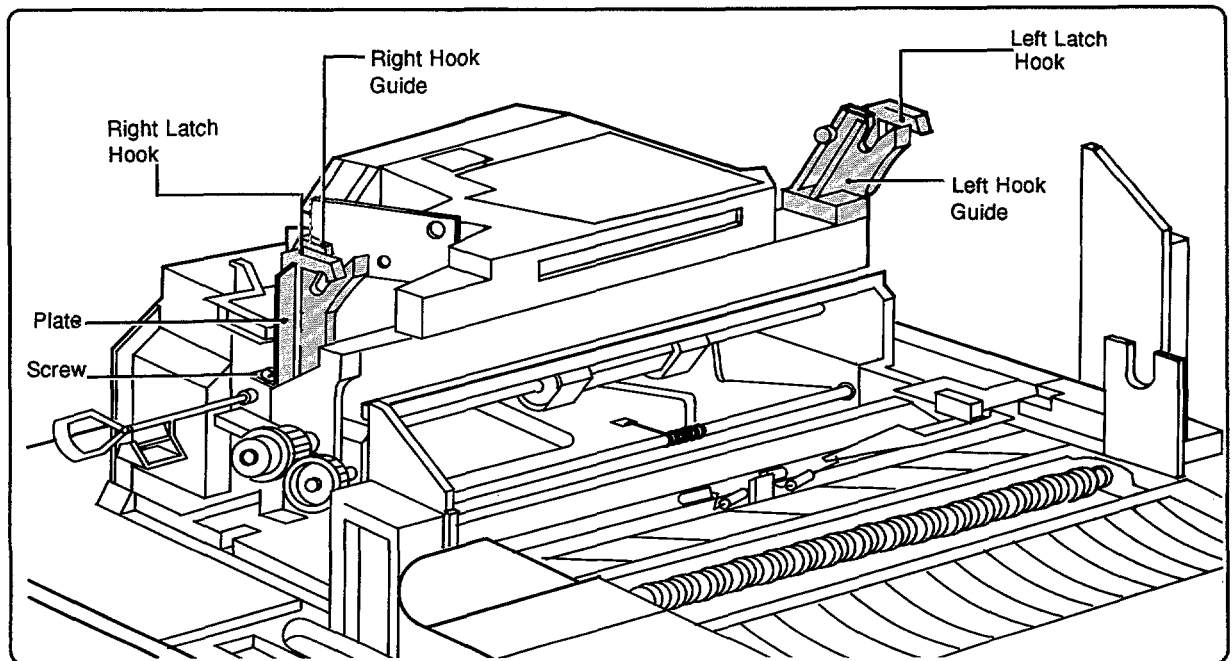


Figure 6-23. Cover Latch Assembly

PAPER PICKUP/INPUT TRAY AREA

General

To access assemblies in the paper pickup/input tray area, the Main Body Covers, Front Support Plate, and DC Power Supply Assembly must first be removed. Other assemblies, as noted, must also be removed for particular items.

Paper Sensing Arm

Care must be taken not to damage the Paper Sensing Arm (see Figure 6-24) and Fiber Optic Cable when removing the DC Power Supply Assembly.

1. Remove the Main Body Covers, Front Support Plate, and DC Power Supply Assembly.
2. Remove the screw (1) securing the Paper Sensing Arm bracket to the Main Body Assembly (see Figure 6-24 for location).
3. Slide the entire Paper Sensing Arm out the right side of the printer.

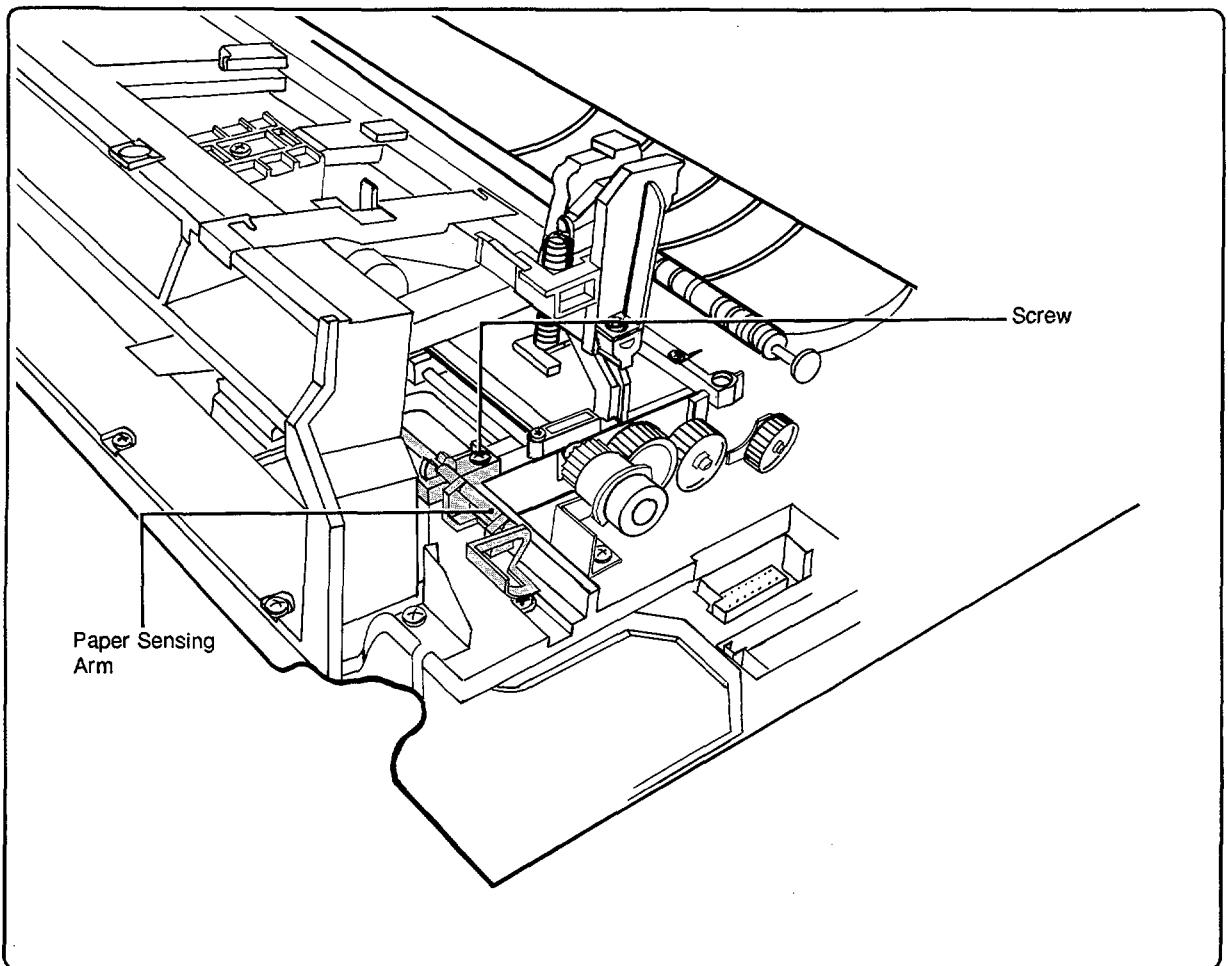


Figure 6-24. Paper Sensing Arm

Laser Shutter Arm

The Laser Shutter Arm (Figure 6-25) engages a plastic tab on the underside of the Laser/Scanning Assembly when an EP-S Cartridge is installed and allows the laser beam to exit the Laser/Scanning Assembly.

1. Remove the Main Body Covers, Front Support Plate, and DC Power Supply.
2. Remove the High-Voltage Power Supply Assembly and the Laser/Scanning Assembly.
3. Remove the Right and Left Cover Latch Hooks.
4. Remove either the Right or Left Hook Guide.
5. Remove the metal plate from under the Laser Shutter Arm (1).
6. Slide the shaft with the Laser Shutter Arm out the side of the printer.

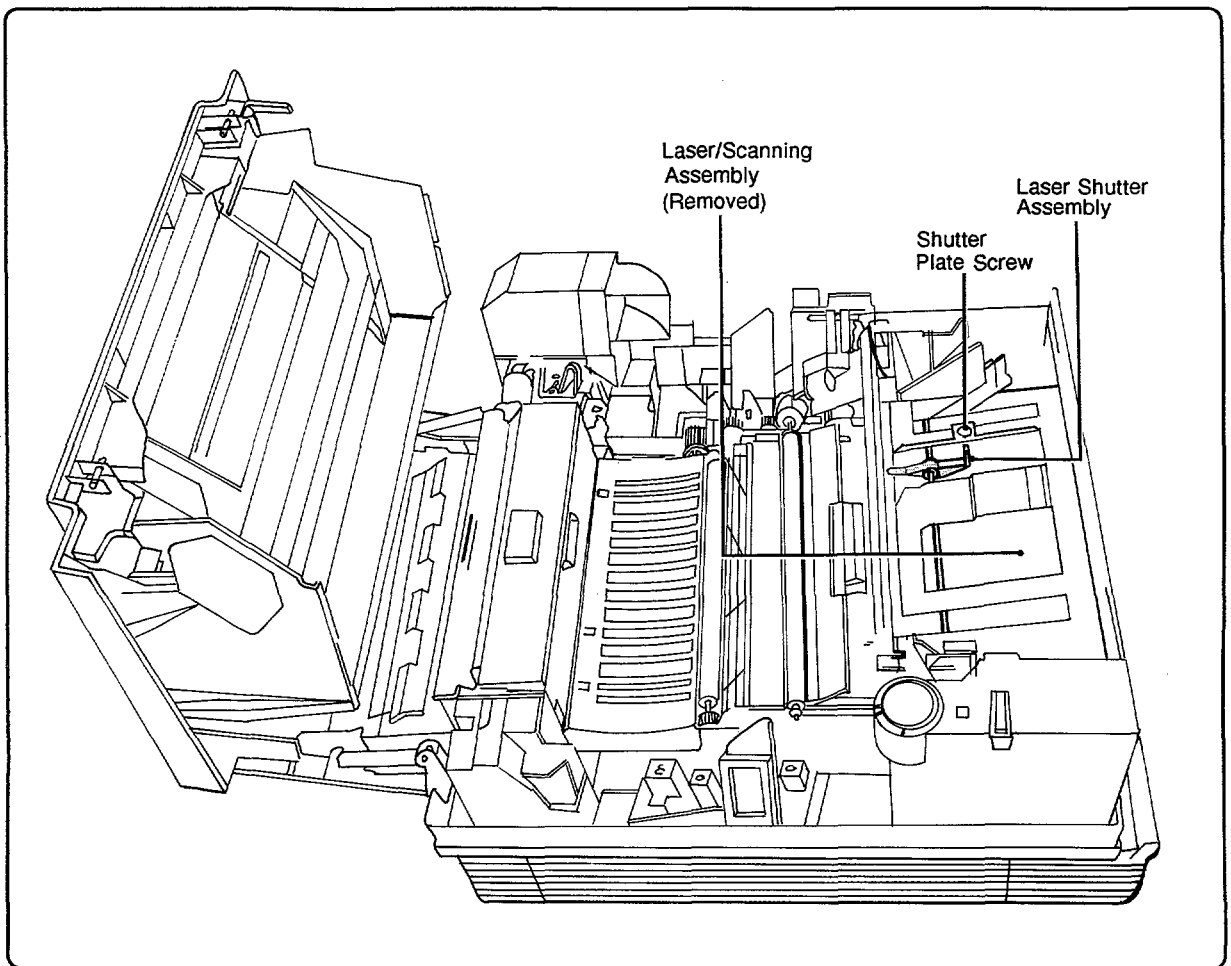


Figure 6-25. Laser Shutter Arm

Feed Roller Assembly

1. Remove the Main Body Covers, Front Support Plate, and DC Power Supply.
2. Remove the High-Voltage Power Supply Assembly.
3. Remove the screws (2) that secure each end of the Feed Roller Assembly (see Figure 6-26).
4. Lift slightly and slide the assembly through the right side opening, being careful not to damage the Paper Sensing Arm.

When reinstalling the assembly, be careful not to deform the left side grounding spring.

Caution



Do not attempt to replace any parts on the shaft. The entire assembly must be replaced as a unit.

Note



Due to wear characteristics, the Separation Pad (see Registration Assembly section below) and the Feed Roller Assembly should be replaced at the same time.

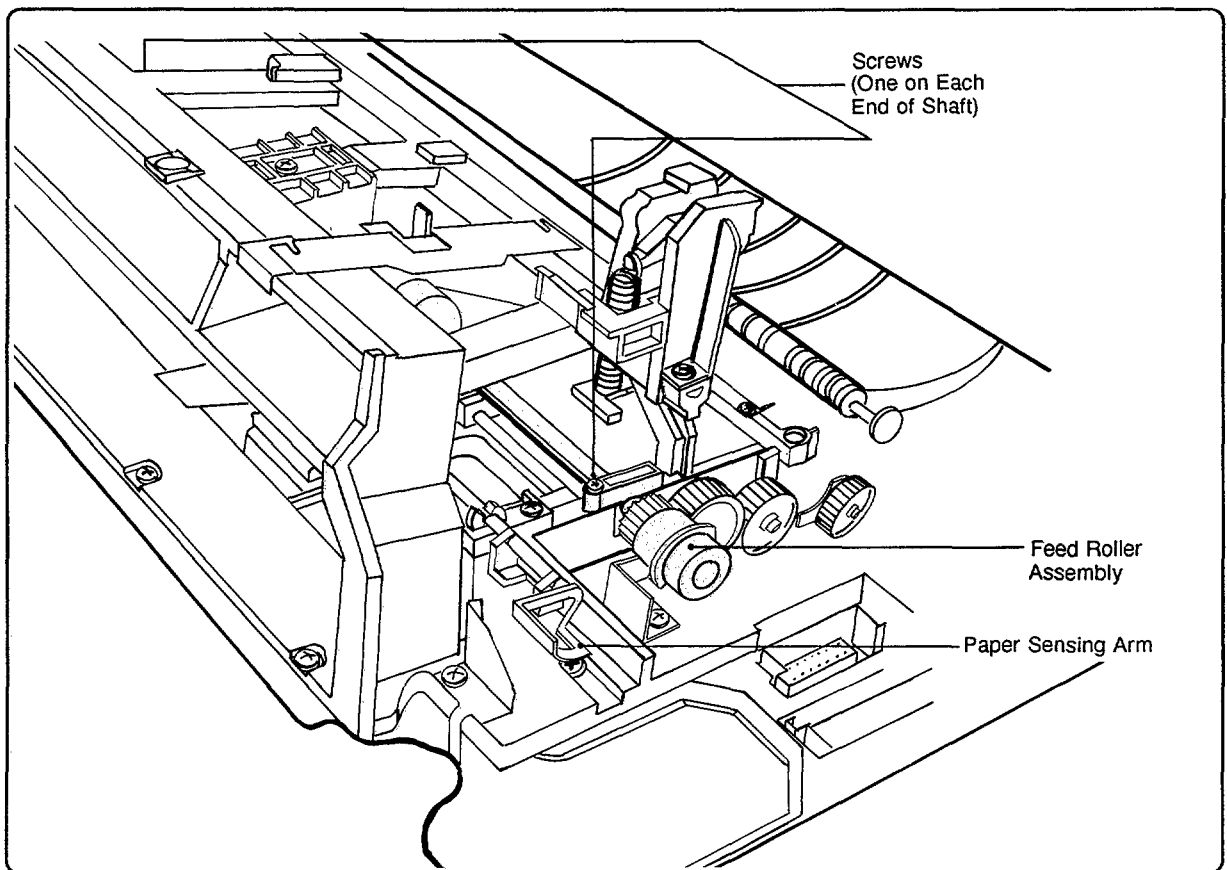


Figure 6-26. Feed Roller Assembly

Manual Feed Guide

1. Remove the Main Body Covers, Front Support Plate, and DC Power Supply.
2. Remove the Paper Sensing Arm Assembly (1) and Laser/Scanning Assembly (4).
3. Remove the Feed Roller Assembly (see above).
4. Remove the screw (1) securing the Manual Feed Guide (see Figure 6-27) and slip the guide out of the printer.

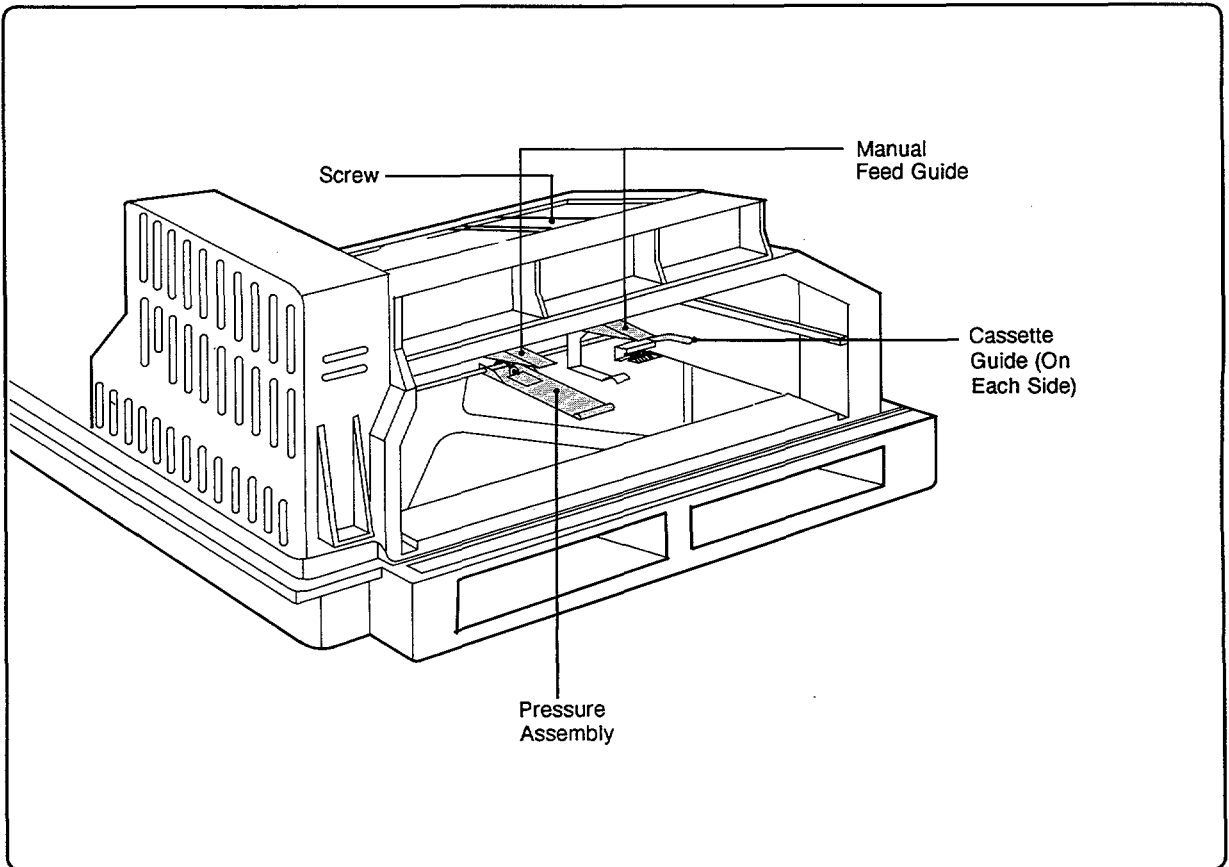


Figure 6-27. Manual Feed Guide and Pressure Assembly

Pressure Assembly

The Pressure Assembly (see Figure 6-27) is attached to the bottom of the Main Body Assembly. To access it, everything in the top printer cavity *except* the hinges, Feed Guide Assembly, and any components connected to the Main Body Block (plastic casting) must first be removed.

1. Remove the Main Body Covers, Front Support Plate, Fusing Assembly, DC Power Supply Assembly, the High-Voltage Power Supply Assembly, AC Power Module, Registration Assembly, and Main Motor and Drive Assembly.
2. Remove the screws (8) securing the Main Body Block and the 57- and 19-Tooth Gear Support Bracket (2) to the Base Plate.
3. On the bottom of the Main Body Block (see Figure 6-28), remove the screws (2) that secure the Pressure Assembly shaft and cassette guides, and remove the assembly.

Note



When reinstalling the Main Body Assembly, ensure that the Feed Guide grounding spring plate fits *under* the grounding tab on the Feed Guide Assembly (see Figure 6-34). Also be sure the Main Body Block fits in its guide pins before screws are tightened.

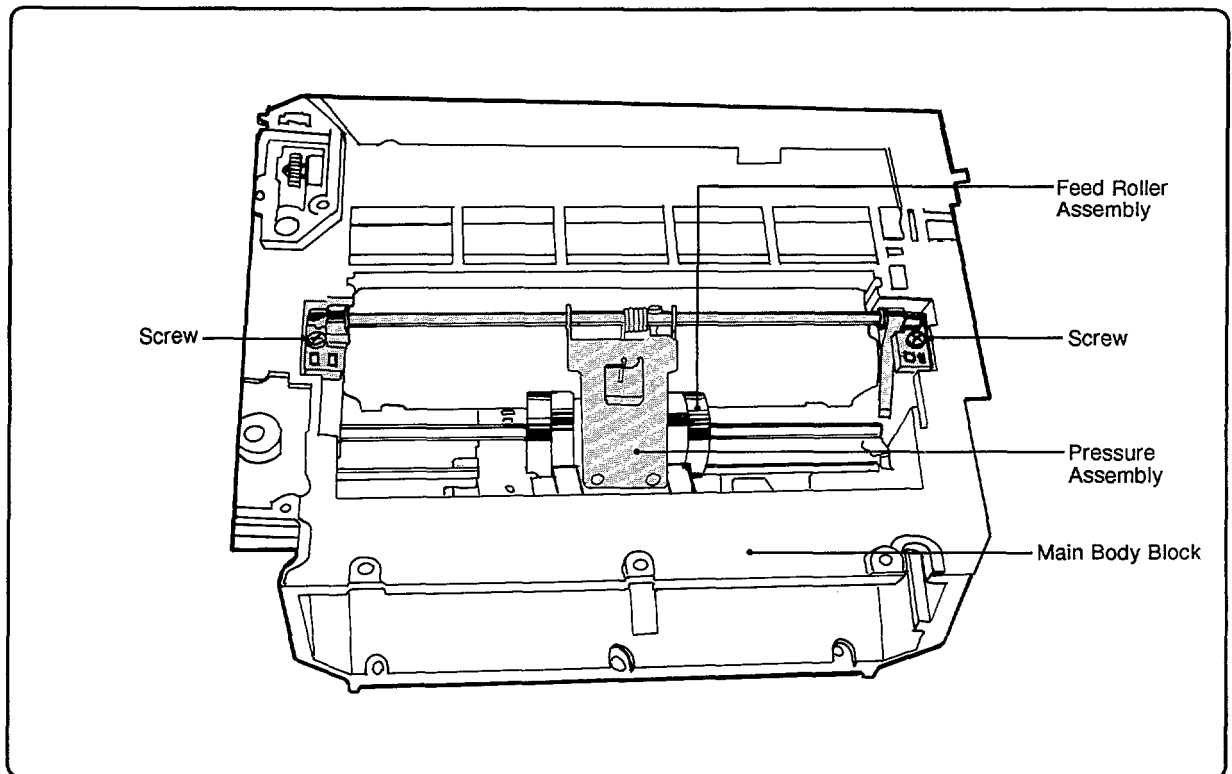


Figure 6-28. Main Body Block (Inverted)

REGISTRATION ASSEMBLY

General

The Registration Assembly can be removed without removing the DC Power Supply. When replacing, the escape (drive) gear at the right end of the assembly must slide under the solenoid on the Paper Control PCA. The DC Power Supply may need to be removed to do this.

Registration Assembly

Note Prior to removing the Registration Assembly, take care to note the position of the brass grounding block located at the left front end of the assembly in order to replace it properly (see "Caution" below).



1. Open the Top Cover Assembly and also remove the paper tray.
2. Remove the screws (2) securing the rear of the assembly and the screws (2) securing the Transfer Guide Plate and the front of the assembly.
3. Lift the Registration Assembly (see Figure 6-29) up and out.

When reinstalling the Registration Assembly, ensure that the Transfer Corona Roller Grounding Block is properly positioned (see following page).

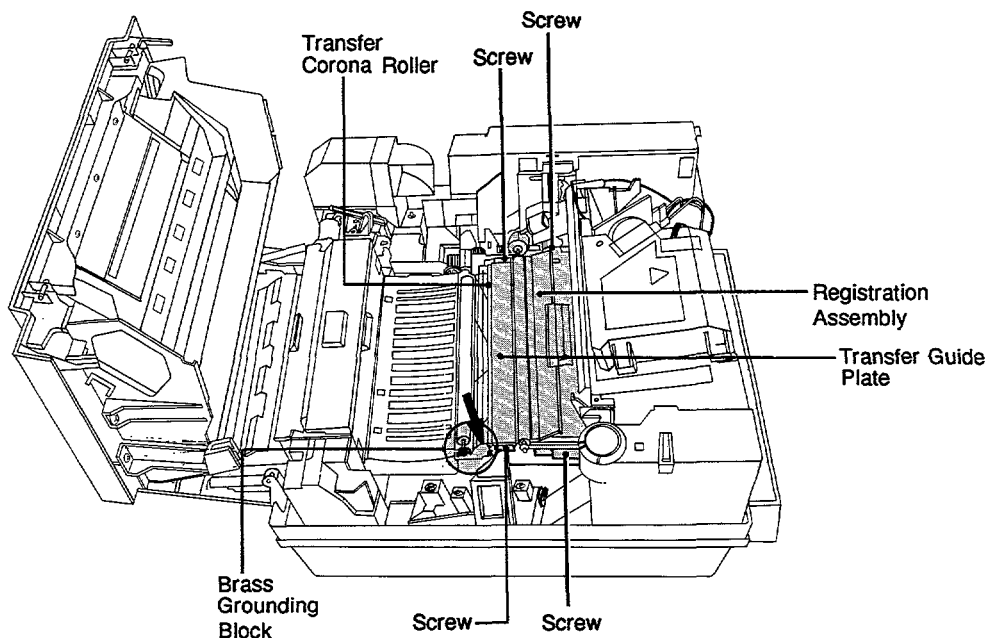


Figure 6-29. Registration Assembly

Transfer Corona Roller Grounding Block

When replacing the Registration Assembly, be sure to rotate the brass grounding block on the end of the Transfer Corona Roller to its full counterclockwise position (the "3:00 O'Clock" position as viewed from the assembly's left end) and position it properly on top of the grounding plate as shown in Figure 6-30.

Caution

Failure to position this block properly may result in intermittent hardware failure indications.

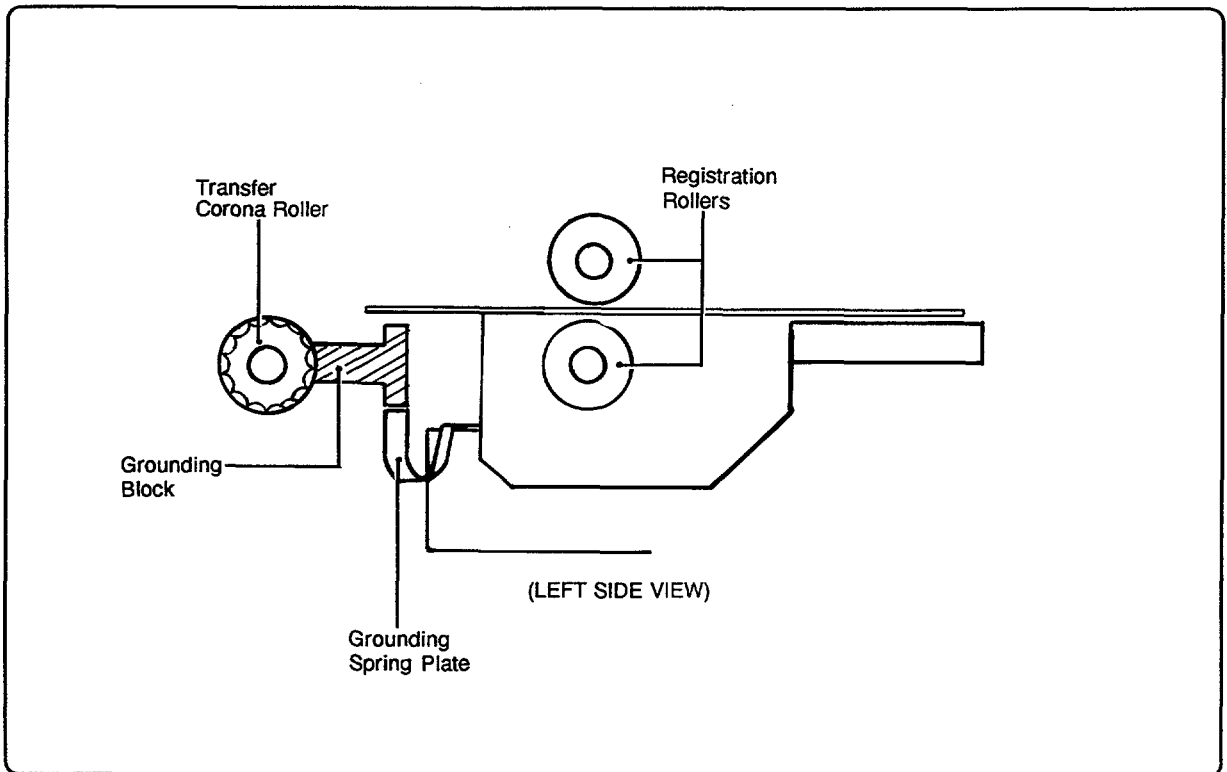


Figure 6-30. Transfer Corona Roller Grounding Block

Separation Pad

Note



Because of wear characteristics, the Separation Pad should be replaced at the same time that the Feed Roller Assembly is replaced. The pad is located at the Paper Tray end of the Registration Assembly (see Figure 6-31). The cork on a worn pad will have a shiny or glazed appearance; the plastic edges will also show signs of wear.

1. Open the Top Cover Assembly and remove paper tray.
2. Remove the Registration Assembly (4) as described above.
3. Remove the screws (2) on the underside of the Registration Assembly securing the Separation Pad.

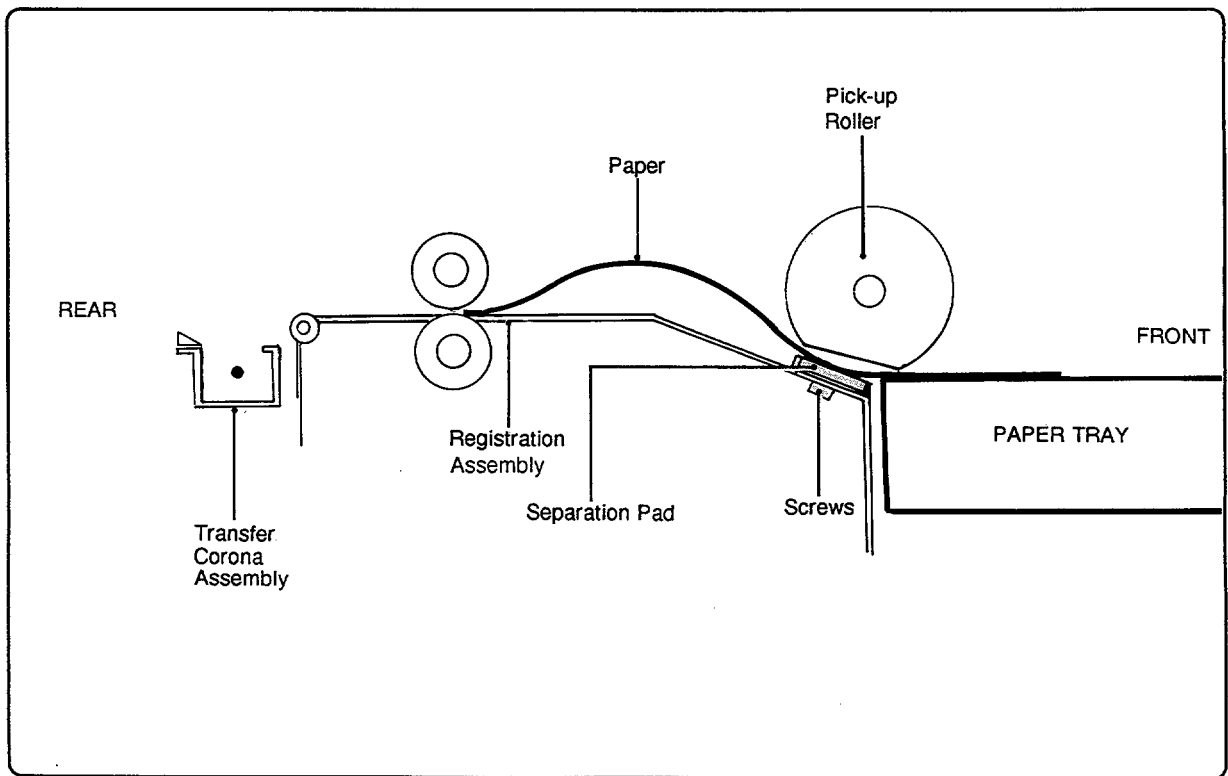


Figure 6-31. Separation Pad

TRANSFER CORONA ASSEMBLY

The Registration Assembly and High-Voltage Power Supply Assembly must be removed before the Transfer Corona Assembly can be removed.

1. Remove the Main Body Covers, Front Support Plate, Registration Assembly, and High-Voltage Power Supply Assembly.
2. Remove the screws (2) at the ends of the Transfer Corona Assembly (see Figure 6-32), and remove it from the printer.

Caution



Do not remove the screws securing the nylon filament. Coronas cannot be restrung, and the entire corona will have to be replaced if the wires are disturbed.

TRANSFER AREA RESISTOR REPLACEMENT

The two 15-Mohm and one 1-Kohm resistors (see Figure 6-32), located toward the front of the printer just beyond the Transfer Corona Assembly, can be accessed by removing the Registration Assembly, High-Voltage Power Supply Assembly, and Transfer Corona Assembly.

1. Remove the Main Body Covers, Front Support Plate, Registration Assembly, High-Voltage Power Supply Assembly, and Transfer Corona Assembly.
2. Remove the screws (2) securing the resistors to be replaced, and remove them from the printer.

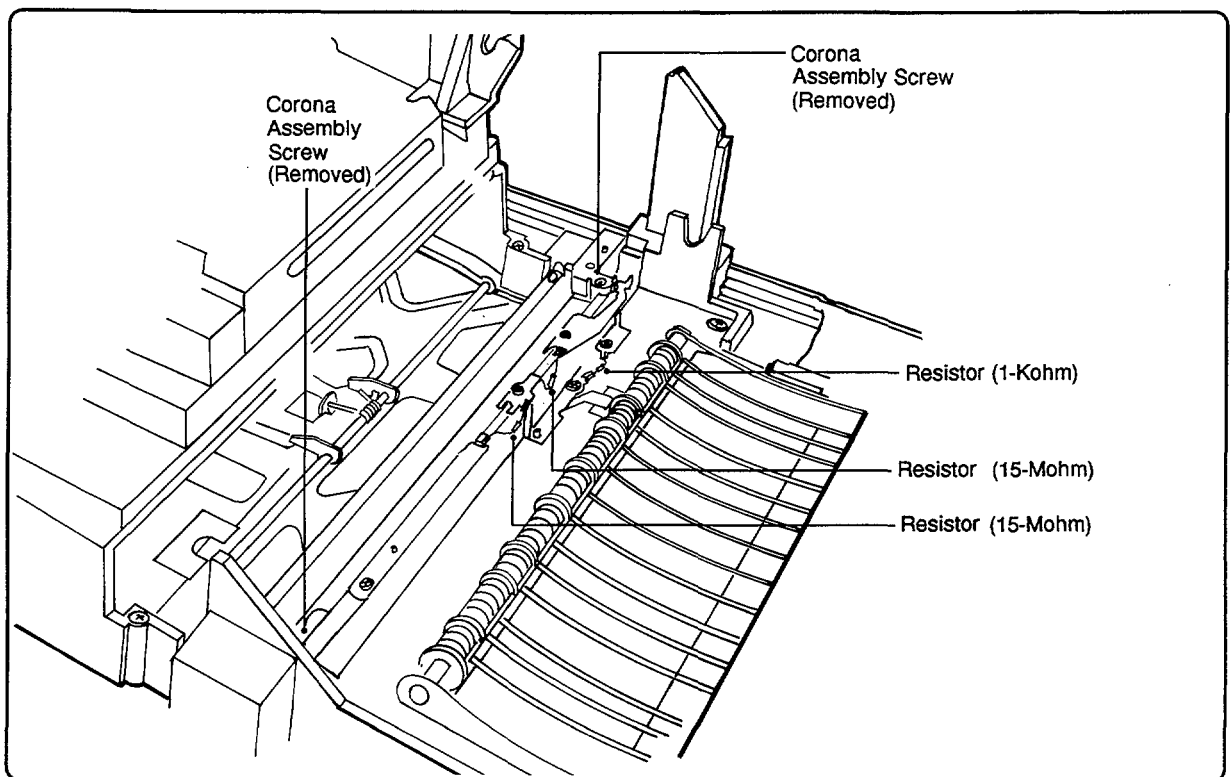


Figure 6-32. Transfer Corona Assembly and Resistor Locations

FEED GUIDE ASSEMBLY

1. Open the Top Cover Assembly.
2. Remove the Gear Cover on the right side of the Feed Guide Assembly.
3. Remove the Main Motor Drive Assembly gear cover.
4. Remove the screws (4) securing the Feed Guide Assembly (see Figure 6-33) and lift it out of the printer.

For replacement, the Fusing Assembly must be removed in order to position the Feed Guide Assembly ground tab on top of the ground spring plate as shown in Figure 6-34. The Feed Guide Assembly must also fit over the two guide pins adjacent to the two screws nearest the front of the printer.

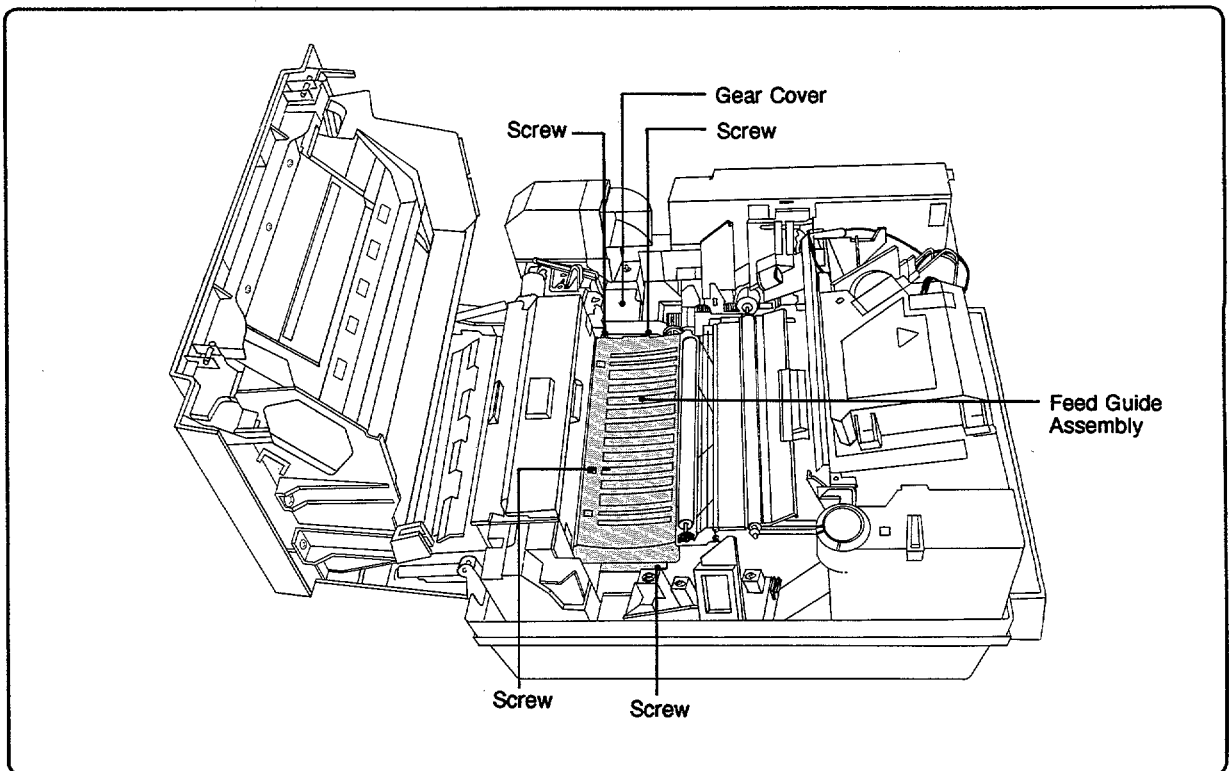


Figure 6-33. Feed Guide Assembly

Feed Guide Grounding Spring Plate

The Feed Guide Assembly has a grounding tab that must sit on a grounding spring plate located beneath the Transfer Corona Assembly (see Figure 6-34). Care must be taken to ensure that the grounding spring plate fits under the grounding tab on the Feed Guide Assembly whenever it is reinstalled.

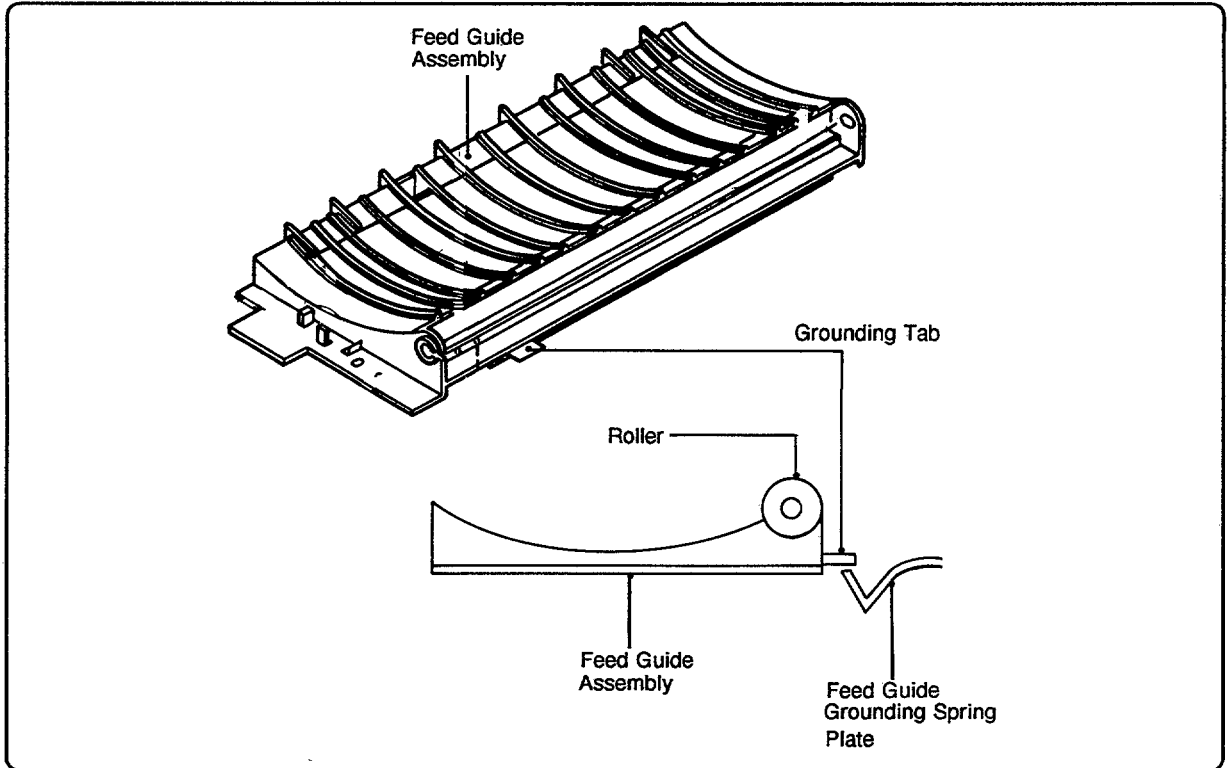


Figure 6-34. Grounding Spring Plate

FUSING ASSEMBLY

Fusing Assembly

1. Open the Top Cover Assembly and remove the silver-colored screws (4) that secure the Fusing Assembly (see Figure 6-35). Be sure to note the location of the screw with the star washer.
2. Lift the assembly straight up and out, using care to unseat the connectors on both ends simultaneously.

Be sure to replace the screw with the star washer in its correct location.

Exit Sensor PCA and Thermistor

The Thermistor is attached to the Exit Sensor PCA. Follow the instructions below to remove these assemblies.

1. Remove the Fusing Assembly (see above).
2. Remove the Exit Sensor PCA cover (1) (see Figure 6-35).
3. Remove the screw (1) securing the right side Fusing Assembly cover (see Figure 6-35), and slide the cover up and out (the plastic cover will flex around the lever arm on the assembly).
4. Remove the electrical lug connector screws at the left and right ends of the assembly.
5. Remove the screws (2) securing the Fusing Assembly front cover to the assembly and, to avoid damage to the Thermistor spring mount, carefully move the cover *slightly* away from the Fusing Assembly. Be careful not to lose the wavy washers.
6. Remove the screw (1) securing the Thermistor and lift it off its mount (see Figure 6-36).
7. Remove the screws (2) securing the Exit Sensor PCA, carefully remove it from its two positioning tabs (see Figure 6-36), and remove it and the Thermistor from the Fusing Assembly.

Upon reinstallation, refer to Figure 6-36 for proper routing of the Thermistor cable.

Caution



When replacing the brass-colored screws, be careful not to strip them; they should be snug but not overly torqued.

Thermoprotector

1. Complete steps 1 - 6 of the removal procedure for the Exit Sensor PCA and Thermistor described above.
2. Remove the screws (2) that secure the Thermoprotector (see Figure 6-36) and lift it out.

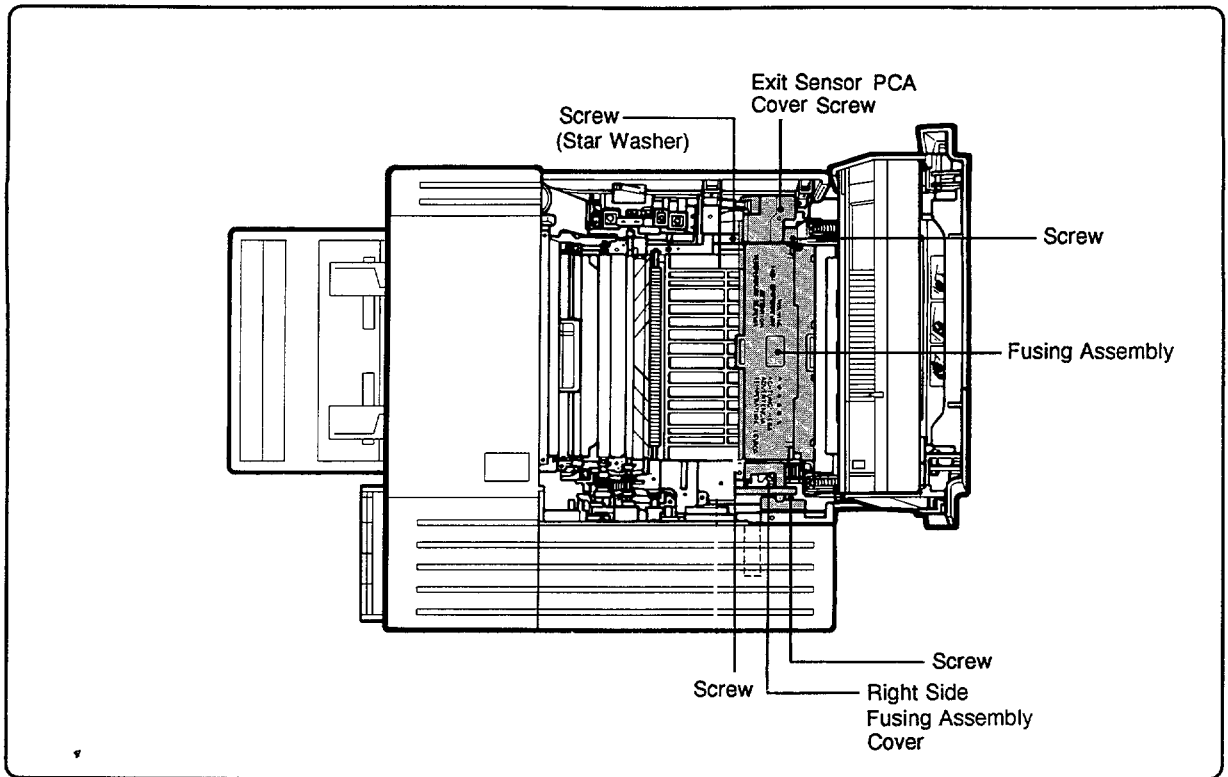


Figure 6-35. Fusing Assembly

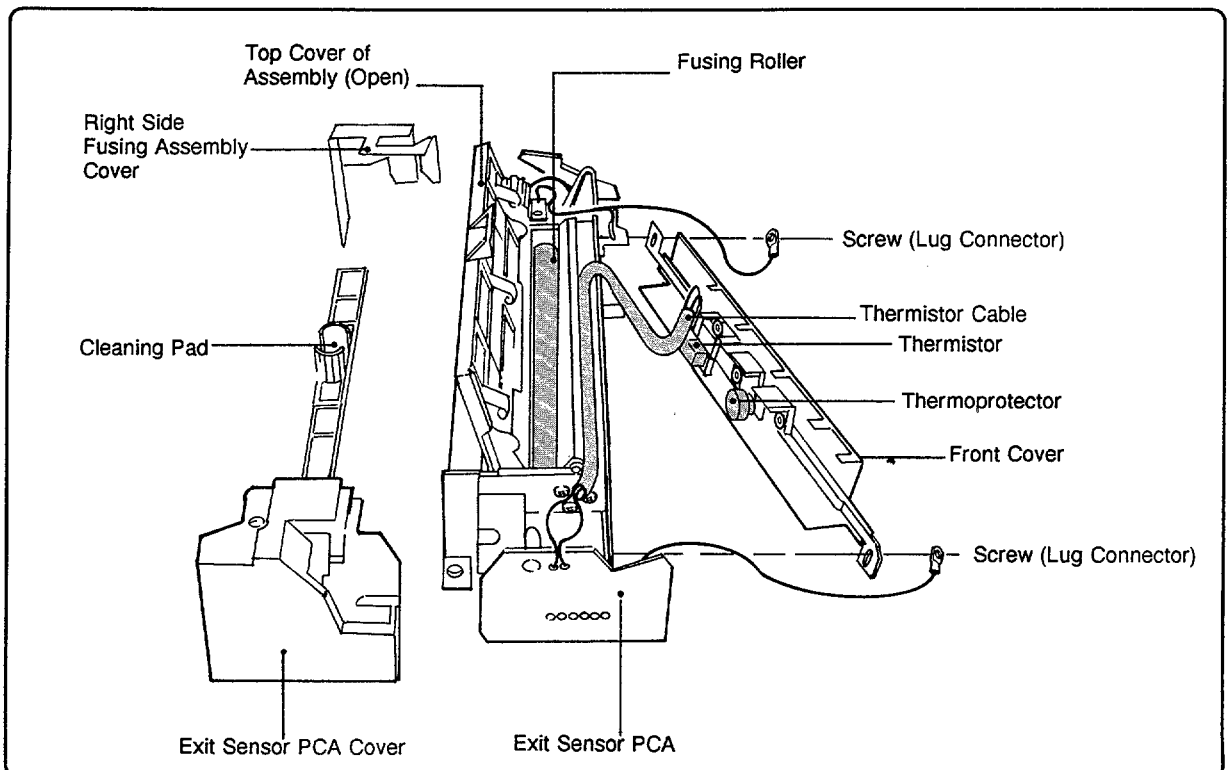


Figure 6-36. Fusing Assembly Components

Exit Sensor Arm

1. Remove the Fusing Assembly (4).
2. Remove the Exit Sensor PCA cover (1) and the screws (2) securing the Exit Sensor PCA to the Fusing Assembly.
3. Remove the brass-colored screws (2) securing the Exit Shutter Arm Assembly (located on the lower back side of the Fusing Assembly), remove the assembly from the retaining pins, and carefully pop the Exit Sensor Arm off the assembly.
4. Pull the Exit Sensor Arm (Flag) out the side of the unit.

Caution



When replacing the brass-colored screws, be careful not to strip them; they should be snug but not highly torqued.

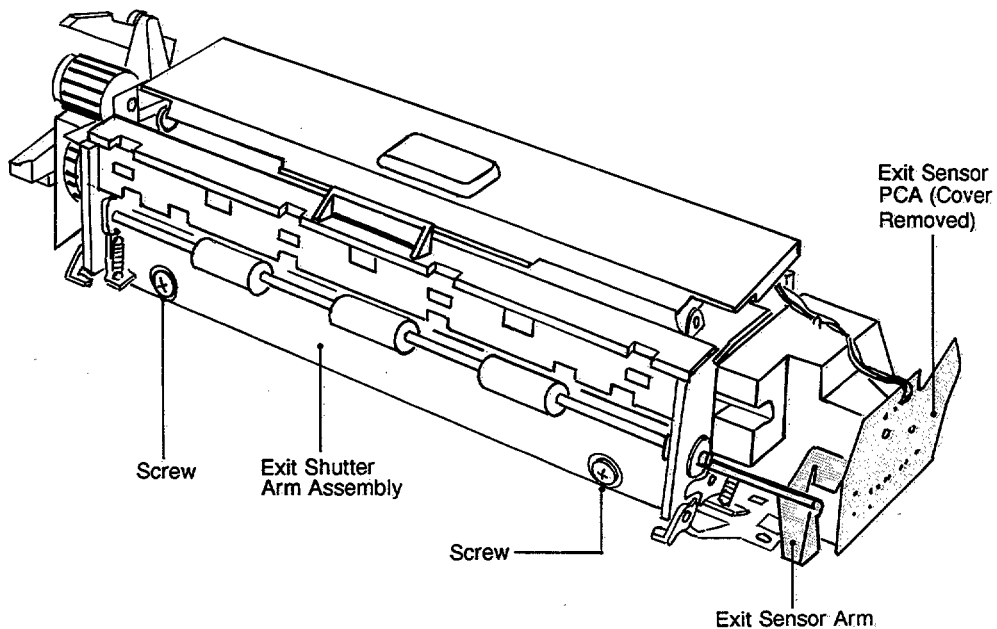


Figure 6-37. Exit Sensor Arm

6-4. TOP COVER ASSEMBLY COMPONENTS

General

The Top Cover Assembly (see Figure 6-38), which is essentially the same for both printers, is the hinged lid that opens when the Top Cover Release Button is pressed. It houses the EP-S Cartridge and contains the Mirror, Shutter, Erase Lamp, and Delivery Assemblies.

Note



All Top Cover Assemblies can be replaced without separating the Top Cover Assembly from the rest of the printer, except for the Delivery Assembly, Static Eliminator, the Hinge Bracket Plates, and the Hinge Assemblies.

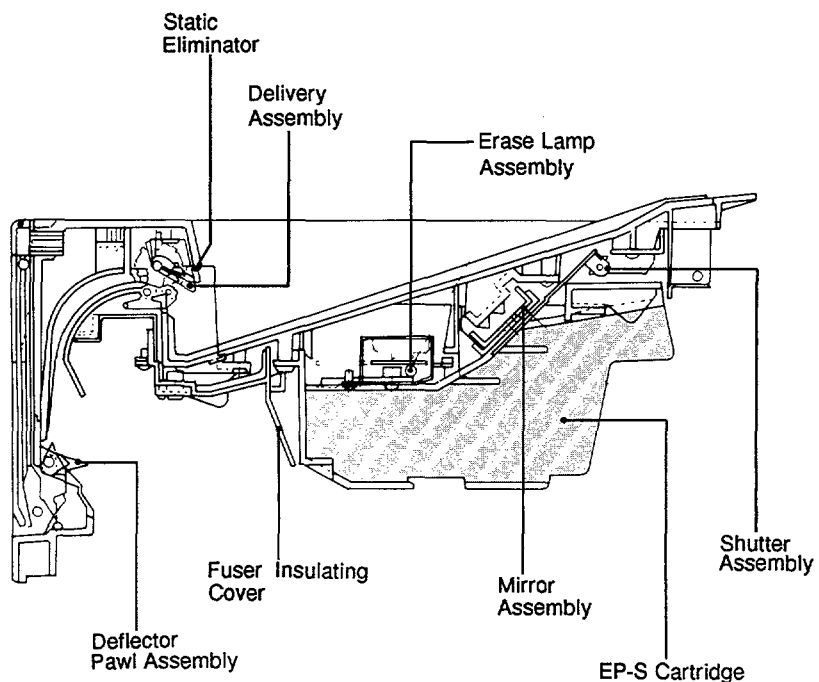


Figure 6-38. Top Cover Section (HP 33440 shown)

TOP COVER ASSEMBLY REMOVAL

Two methods are possible for removing the Top Cover Assembly: *Method One* should be used if the Hinge Assemblies or Hinge Bracket Plates (see Figure 6-39 and Figure 6-40) must be replaced; *Method Two* should be used in all other cases.

Method One:

1. Open the Top Cover Assembly and remove the EP-S Cartridge.
2. Remove the Hinge Security Plates (one screw on each hinge plate) and separate the two coil springs on the left side (see Figure 6-39). Swing the Hinge Springs out of the way.
3. Remove the Hinge Bracket Plate screws (4 – two through each Hinge Bracket Plate) where they attach to the Top Cover Assembly, supporting the Top Cover Assembly as you do so.
4. Separate the Top Cover Assembly from the Hinge Bracket Plates.

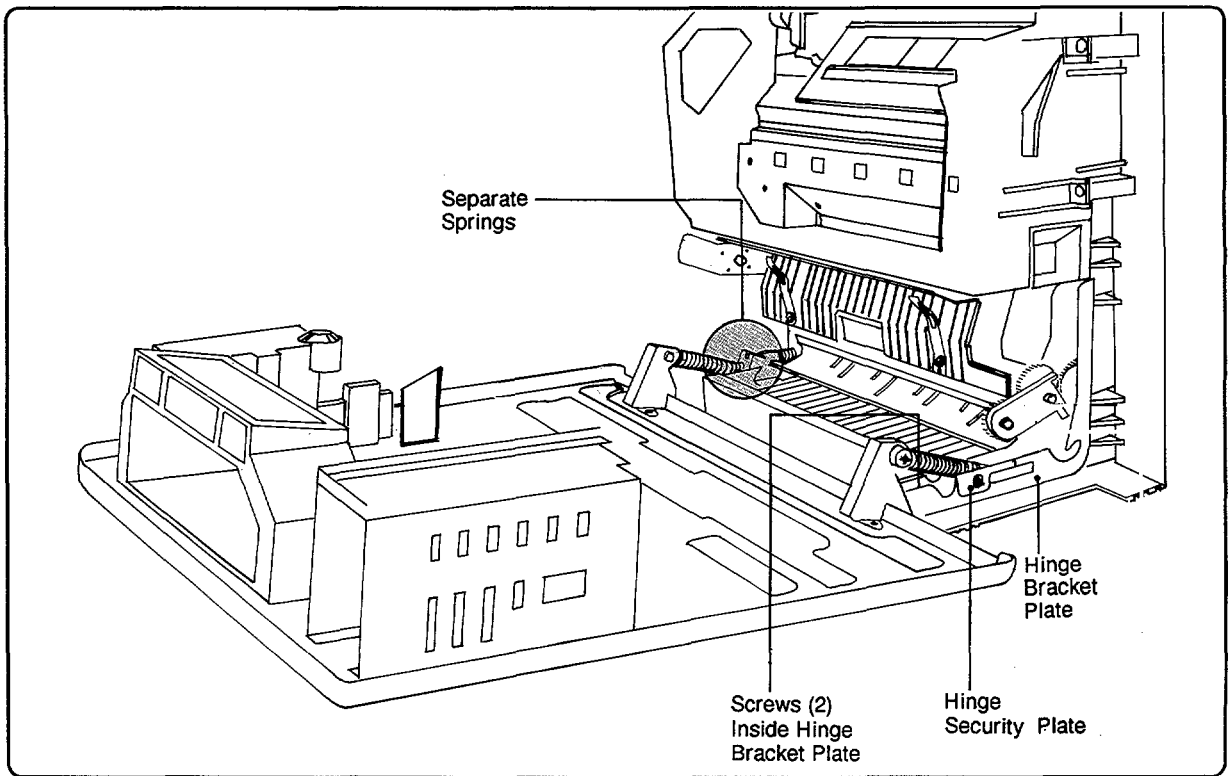


Figure 6-39. Top Cover Assembly Removal, Method One

Method Two:

Additional required tool: short (stubby) No. 2 Phillips magnetic screwdriver.

1. Open the Top Cover Assembly and remove the Fusing Assembly.
2. While supporting the Top Cover Assembly (opened 45°) from the rear, remove the hinge mounting screws (2 each) from the Hinge Assemblies where they attach to the Main Body Base Plate.
3. Lift the Top Cover Assembly from the Printer.

Hint

One of the two screws in each of the Hinge Assemblies can be removed and replaced with the Top Cover Assembly *fully* opened.

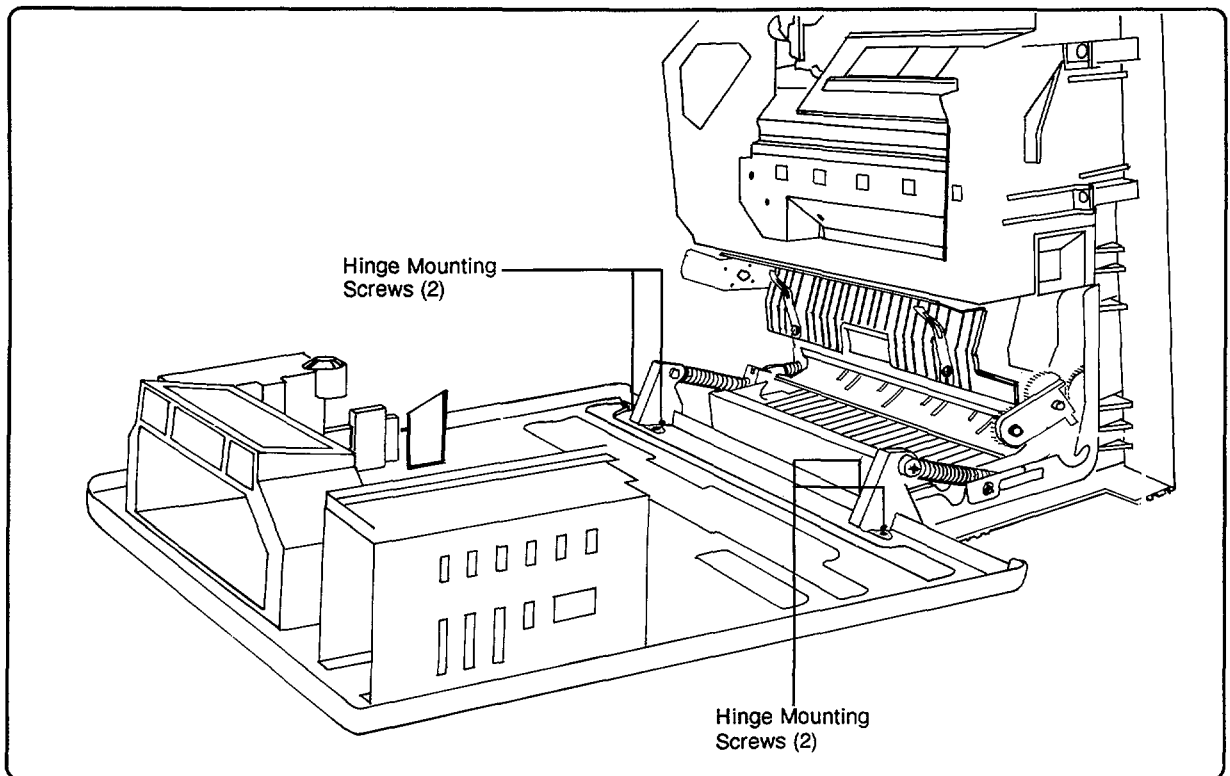


Figure 6-40. Top Cover Assembly Removal, Method Two

MIRROR SHUTTER ASSEMBLY

The Mirror Shutter Assembly (Figure 6-41) is located above the Erase Lamp Assembly near the top of the opened Top Cover Assembly.

1. Open the Top Cover Assembly and remove the EP-S Cartridge.
2. Remove the Mirror Shutter Assembly mounting screws (3) shown in Figure 6-41.
3. Take care not to touch or otherwise damage the mirror when removing the Mirror Shutter Assembly.

Caution



When handling the Mirror Assembly, be careful not to touch the mirror's surface or allow it to be scratched (it is a "first-surface" mirror). If the mirror must be cleaned, use a soft, clean, damp, lint-free wipe with a cleaning fluid approved for camera lenses. See Chapter 4, Section 4-4, "Cleaning the Printer."

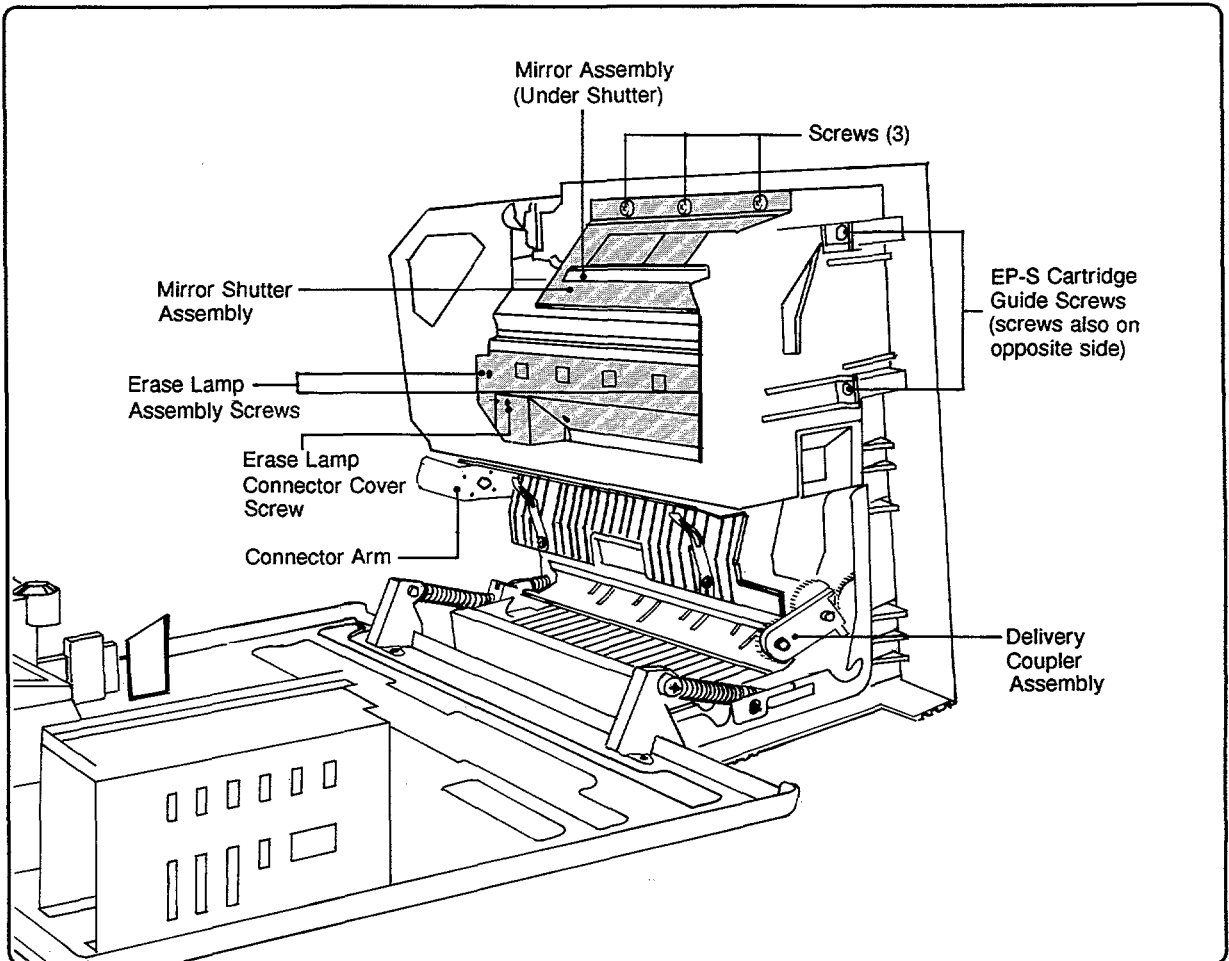


Figure 6-41. Shutter, Mirror, and Erase Lamp Assemblies

MIRROR ASSEMBLY

1. Open the Top Cover Assembly and remove the EP-S Cartridge.
2. Remove the Mirror Shutter Assembly (3) or slide the shutter to the right past the lever and swing it up and out of the way.
3. Note the orientation of the Mirror Assembly so it may be returned to the same position (possibly mark the top of the mirror frame or note the location of the formed part number).
4. Loosen the plastic frame (the EP-S Cartridge Guide) holding the Mirror and Erase Lamp assemblies by removing the large upper screws (4 of 5) that secure the EP-S Cartridge Guide Frame (see Figure 6-41) to the Top Cover Assembly.
5. Slide the Mirror Assembly slightly to the right and lift it out the left side of the frame.
6. Ensure that the Mirror Assembly is returned to the printer in the correct orientation. The assembly has a 6 mm slot on the left and an 8 mm slot on the right as shown in Figure 6-42.

If the mirror must be cleaned, use a soft, clean, damp, lint-free wipe with a lens cleaning fluid approved for camera lenses. See Chapter 4, Section 4-4, "Cleaning the Printer."

Note:

When returning the mirror to the cartridge guide, be sure to orient it as shown below.

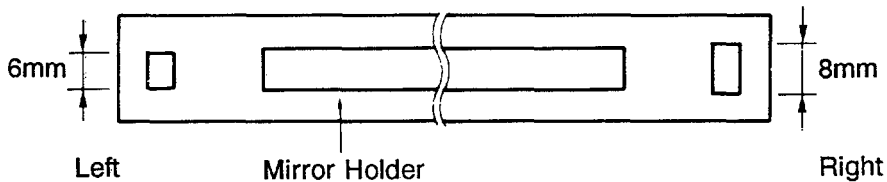


Figure 6-42. Mirror Holder

ERASE LAMP ASSEMBLY

The Erase Lamp Assembly (see Figure 6-41) contains the Erase Lamp PCA and surrounding sheet metal.

1. Open the Top Cover Assembly and remove the EP-S Cartridge.
2. Remove the connector cover (1) on the Erase Lamp Assembly (see Figure 6-41).
3. Remove the screws (2) securing the PCA to the Erase Lamp Connector Arm (see Figure 6-43).
4. Remove the screws (2) on the top face of the Erase Lamp Assembly.
5. Lift out the Erase Lamp Assembly.

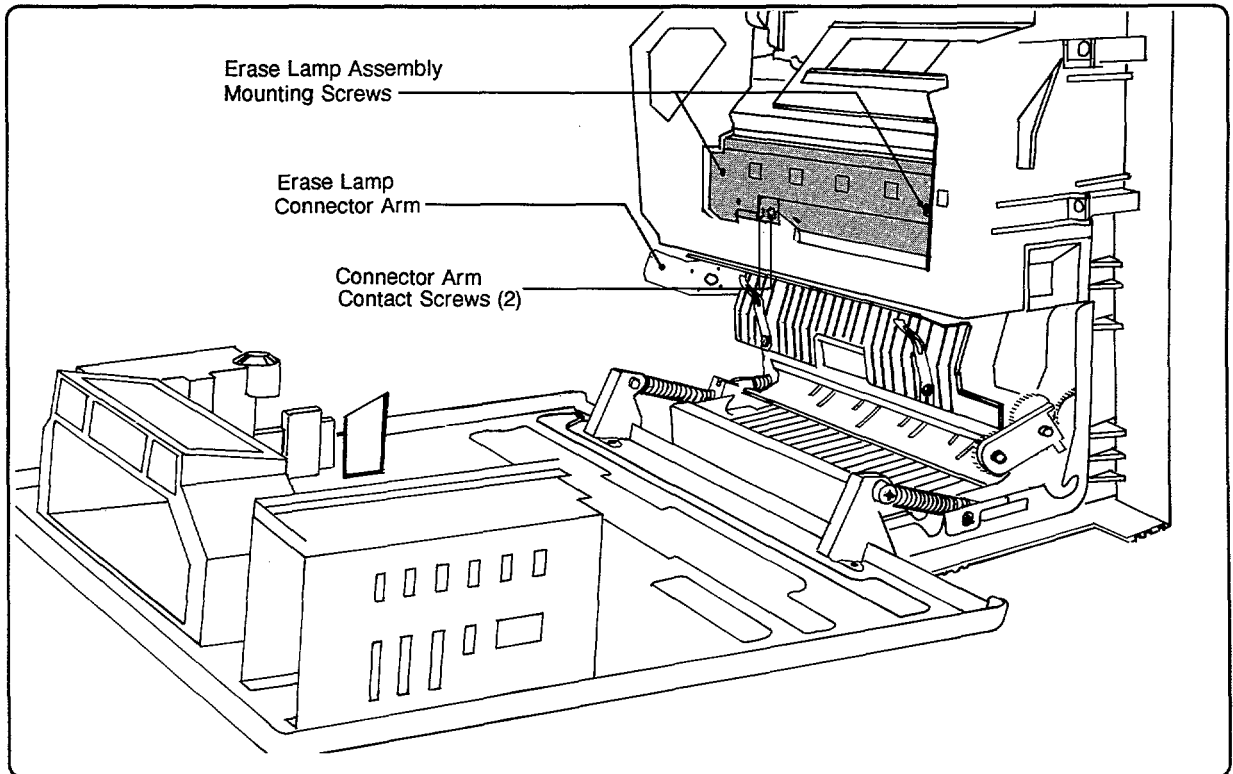


Figure 6-43. Erase Lamp Assembly

ERASE LAMP CONNECTOR ARM

The Erase Lamp Connector Arm (see Figure 6-41) supplies power to the lamps from the Exit Sensor PCA located on the Fusing Assembly.

1. Open the Top Cover Assembly and remove the EP-S Cartridge.
2. **HP 33440 only:** Remove the Fusing Assembly and the black plastic Fuser Insulating Cover in the Top Cover Assembly (see "Fuser Insulating Cover" below).
3. Remove the connector cover (1) on the Erase Lamp Assembly (see Figure 6-41).
4. Remove the screws (2) securing the Erase Lamp Connector Arm to the Erase Lamp Assembly (see Figure 6-43).
5. Remove the screws (2 for HP 33440, 1 for HP 33449) securing the connector arm to the Top Cover Assembly.
6. Drop the connector out.

DELIVERY AREA

The Delivery Assembly (Figure 6-45) guides printed paper to the Face-Down (Top) Output Tray. Note that removal of the Delivery Assembly itself or the Output Static Eliminator will require separating the Top Cover Assembly from the printer.

Fuser Insulating Cover

1. Open the Top Cover Assembly and remove the EP-S Cartridge.
2. Remove the Fusing Assembly. (Alternatively, the Top Cover Assembly can be removed instead.)
3. Remove the black-plastic Fuser Insulating Cover screws (the 2 smaller brass-colored pan-head screws with washers) (see Figure 6-44).
4. Insert a small flat-blade screwdriver between the cover and the EP-S Cartridge Guide frame as shown in Figure 6-44, prying the plastic clips away from the cover to release it.

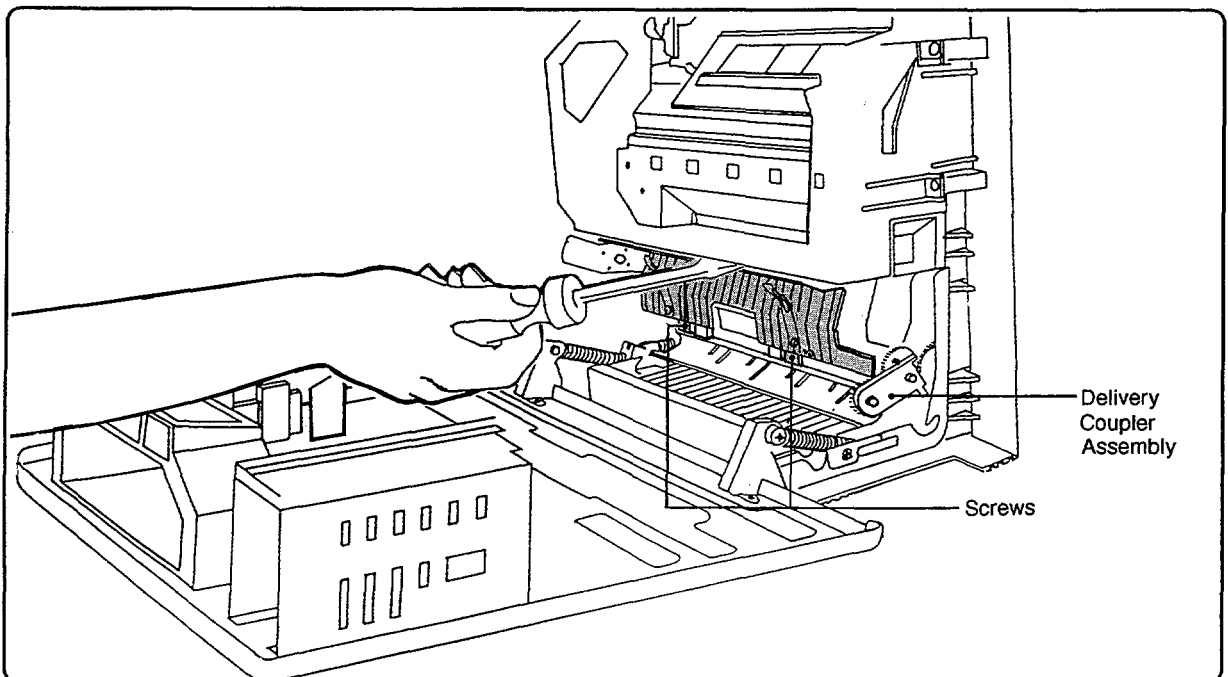


Figure 6-44. Fuser Insulating Cover Removal

Delivery Assembly

1. Remove the hinged Top Cover Assembly from the printer.
2. Remove the black plastic Fuser Insulating Cover covering the Delivery Assembly (see above).
3. Remove the Erase Lamp Assembly cover (1) and connector screws (2).
4. Remove the Erase Lamp Connector Arm.
5. With the Top Cover Assembly resting upside down on the work area, remove the screws (5) securing the EP-S Cartridge Guide and remove the Guide from the Top Cover Assembly.
(Minimize disturbance to the Top Cover Assembly to prevent damage to the Mirror Assembly.)
6. Remove the Lower Delivery Cover screws (2, black) and Delivery Assembly mounting screws (4) (see Figure 6-45).
7. Lift the Delivery Assembly, with the Lower Delivery Cover, free of the Top Cover Assembly.
8. Detach the Lower Delivery Cover from the Delivery Assembly by removing the brass-colored screws (2).
9. Separate the Delivery Coupler Assembly from Delivery Assembly.

When reinstalling the Delivery Assembly, position the Delivery Coupler Assembly as shown in Figure 6-44. When reinstalling the Cartridge Guide, be sure to position the Mirror Assembly mounting slots properly (see Figure 6-42).

Delivery Coupler Assembly

1. Open the Top Cover Assembly and remove the EP-S Cartridge.
2. Remove the Fusing Assembly and Fuser Insulating Cover as described above.
3. Remove the Delivery Coupler Assembly mounting screw (1) and lift it out (see Figure 6-45).

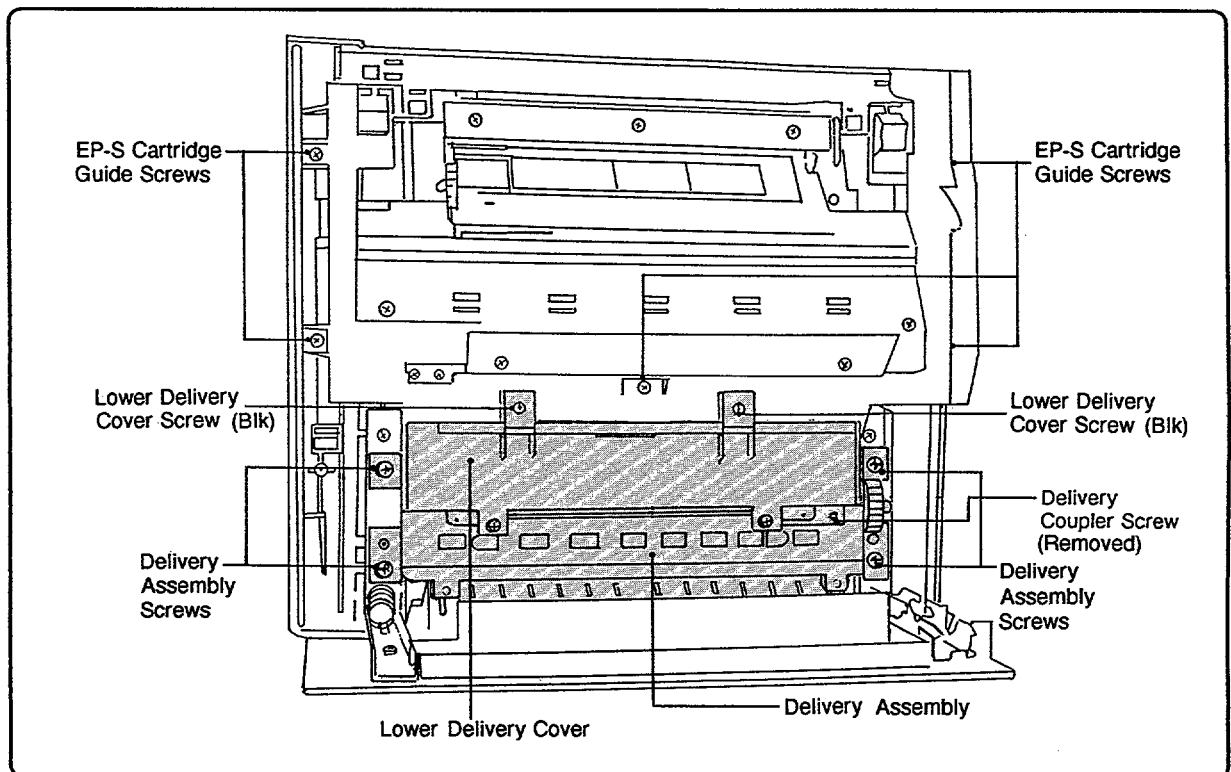


Figure 6-45. Delivery Assembly Removal

Static Eliminator

The Static Eliminator (see Figure 6-46) is the fine fiber brush located where the paper exits to the Top (Face-Down) Output Tray.

1. Remove the Top Cover Assembly and the Delivery Assembly (see above).
2. Remove the screws (2) securing the Static Eliminator.

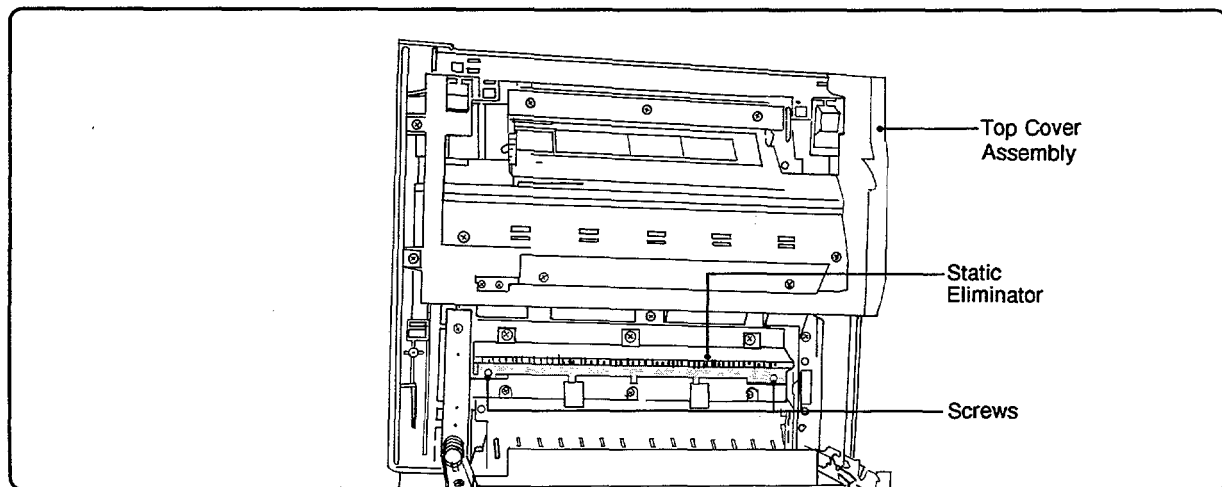


Figure 6-46. Static Eliminator

Deflector Pawls (Claws)

1. With the Top Cover Assembly fully open, pry the right end of the Deflector Pawls (Claws) shaft out of its retaining clip (see Figure 6-47).
2. Slide the assembly to the right out of its retainer.

When reinstalling the Deflector Pawls, ensure that the spring is positioned properly and that it is not damaged (see Figure 6-47).

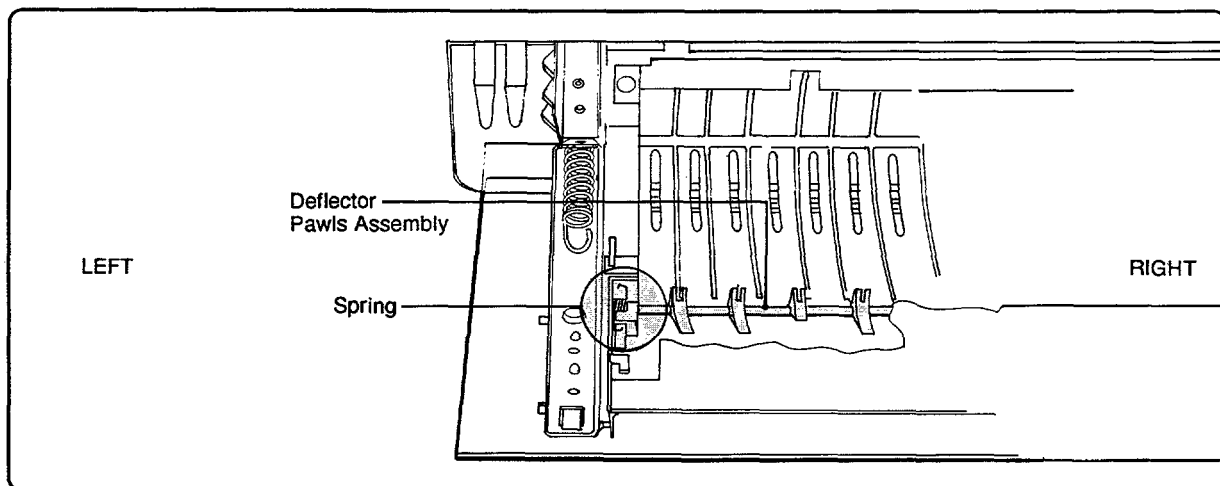


Figure 6-47. Deflector Pawls (Claws)

TOP COVER HINGE BRACKET PLATES

1. Remove the Top Cover Assembly from the printer.
2. If the Hinge Assemblies are still attached to the Top Cover Assembly (see Figure 6-39), remove them (4 screws, 2 on each Hinge Assembly).
3. Remove the Delivery Assembly.
4. Remove the remaining screws (2 each) securing the Hinge Bracket Plates to the Top Cover Assembly and lift them out of the printer.

When reinstalling, note that the Hinge Plate with the coil spring must mount on the left side of the Top Cover Assembly as viewed from the front of the printer.

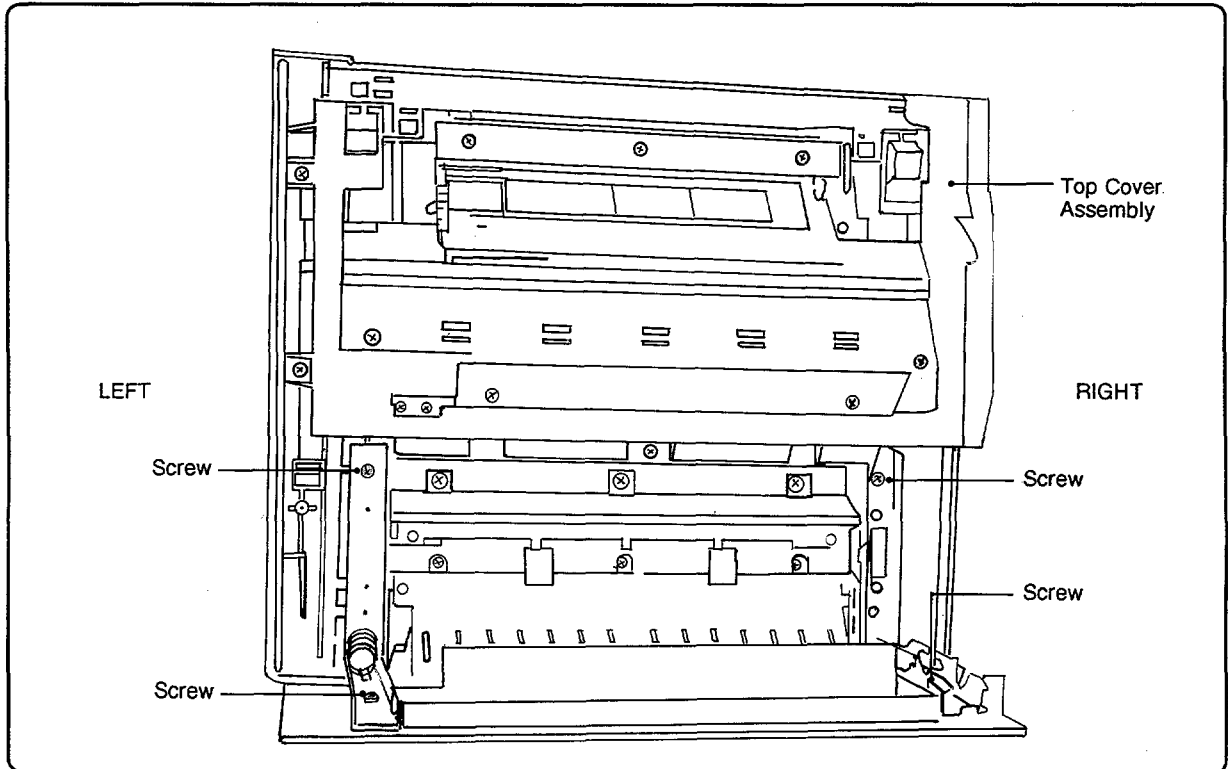


Figure 6-48. Hinge Plate Removal

6-5. BOTTOM COVER COMPONENTS

BOTTOM COVER REMOVAL

The Bottom Cover (see Figure 6-49) encases the components located on the underside of the printer. The Bottom Cover must be removed to replace the Lower Cooling Fan, Interface/Formatter PCA, DC Controller PCA, and some cable assemblies.

Caution



Before turning the printer over, the EP-S Cartridge must be removed as well as any other brackets or fasteners that are not secured. When turning the printer over, use extreme care not to bend or otherwise damage the upper body frame and components. Also remove any accessory memory I/O PCAs and font cartridges at this time, using proper ESD procedures.

For HP 33449 only: With the printer turned over, remove the screws (4) securing the outer Bottom Cover. Lift the rear of the cover until the cover is vertical and remove it from the printer.

For both printers: Remove the screws (9) securing the inner cover and lift it off. Note that on the HP 33440, one screw is accessed through a slot in the Font Cartridge Cover.

LOWER COOLING FAN

1. Remove the Bottom Cover(s).
2. Detach the connector from the DC Controller PCA (see Figure 6-50), remove the screws (4) securing the fan, and lift the fan out of the printer.

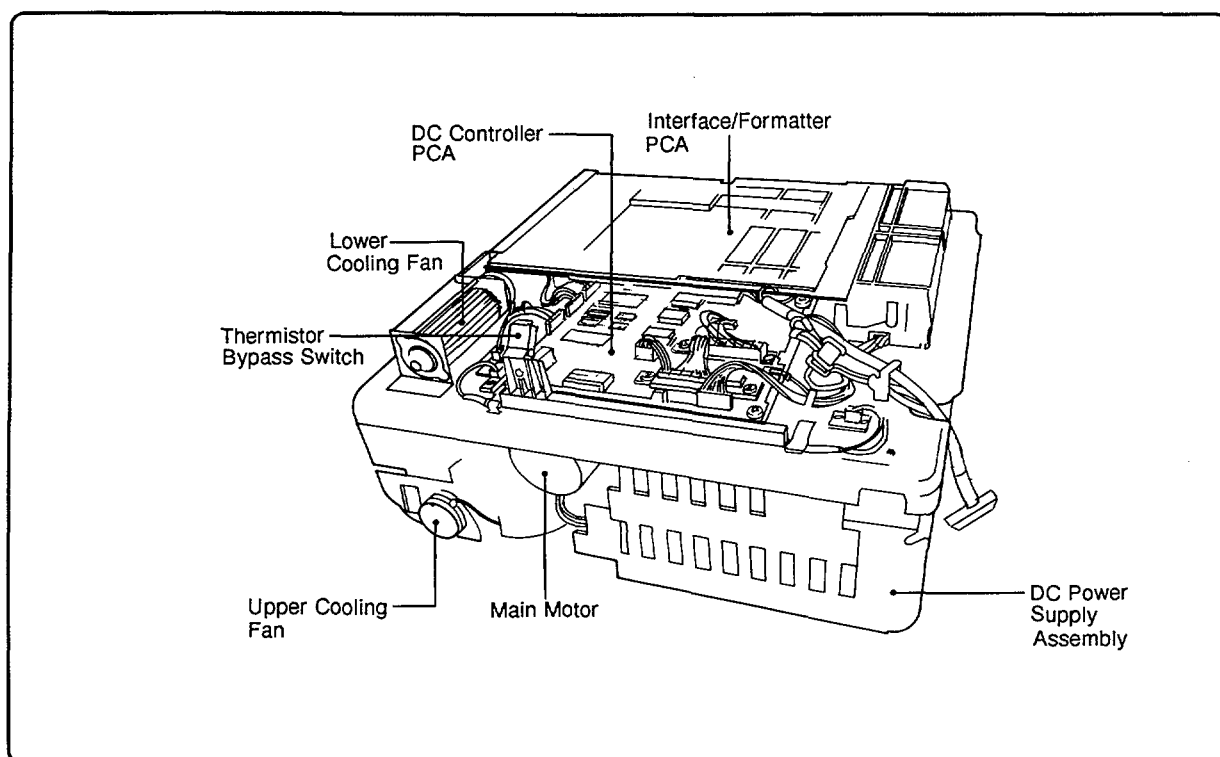


Figure 6-49. Bottom Cover Components

INTERFACE/FORMATTER PCA

The Interface (HP 33440)/Formatter (HP 33449) PCA is located on the underside of the printer, as shown in Figure 6-49.

Caution



Since most PCAs contain components that are sensitive to damage by electrostatic discharge, be sure to use protective measures when removing, installing, or handling any of these assemblies. These measures include static-free workstations and personal grounding devices such as the antistatic wrist strap and grounding mat included in the *Electrically Conductive Field Service Grounding Kit* (HP 9300-0933).

1. Remove any accessory PCAs (expansion memory boards and optional I/O), font cartridges, and the Bottom Cover(s).
2. Disconnect connector J8 (connects to the Control Panel).
3. Remove the Voltage Connector star washer screws (2) (see Figure 6-50) and the screws (4) securing the PCA (2 at the front, 1 at the long edge, and 1 in the center of the board).
4. Remove the screws (2) connecting the I/O Connector Plate to the printer's base plate.
5. Remove the PCA and the attached metal plate by lifting the rear of the board (by the I/O Connector plate) 4 to 6 inches (10 to 15 centimeters) and then pulling it out of the printer. This will allow the two cartridge connectors to slide out of their plastic frame and will disconnect the DC Controller connector.

When reinstalling the Interface/Formatter PCA, ensure that the PCA is aligned with the plastic positioning pins and that the I/O Connector plate does not pinch the cable assembly running between the DC Controller and the Fusing Assembly. *Only when the board assembly is positioned properly should the DC Controller connector be seated and the screws (8) be replaced.*

Note



If the Interface PCA is replaced, the page count should be set to its previous value. Refer to "Setting the Page Count" in Chapter 3, Section 3-7, for instructions.

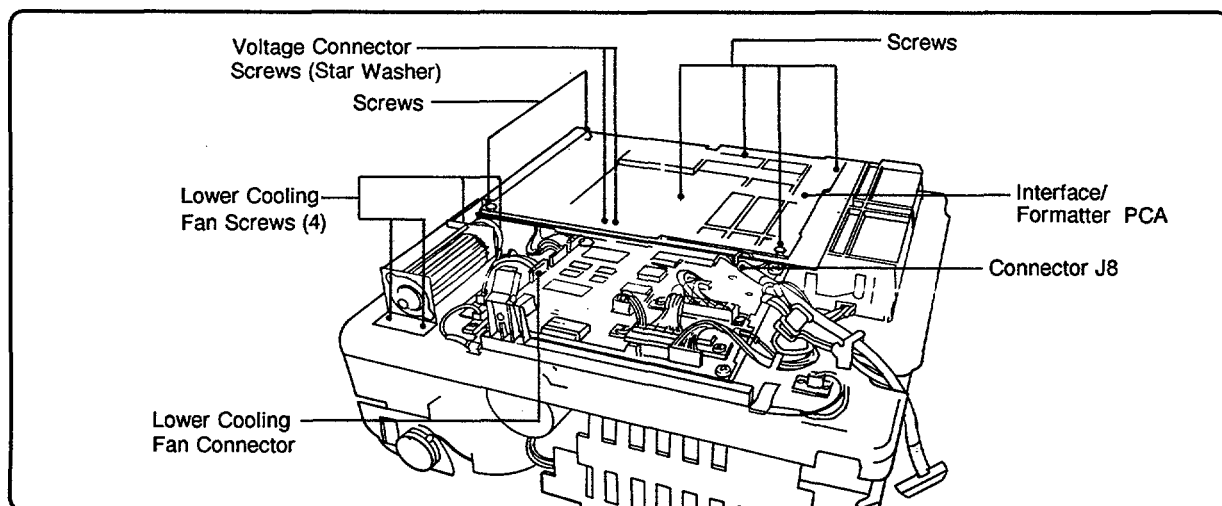


Figure 6-50. Interface/Formatter PCA

DC CONTROLLER PCA

The DC Controller PCA is located on the underside of the printer as shown in Figure 6-49. See notes and cautions for this section.

Caution



Most PCAs (Printed Circuit Assemblies) contain components that are sensitive to damage by electrostatic discharge. When you remove, install, or handle any of these assemblies, be sure to use protective measures including static-free workstations and personal grounding devices such as the antistatic wrist strap and grounding mat included in the *Electrically Conductive Field Service Grounding Kit* (HP 9300-0933). Follow all recommended antistatic procedures.

1. Remove any accessory PCAs (expansion memory boards and optional I/O), font cartridges, and the Bottom Cover(s).
2. Remove the Interface/Formatter PCA (see above).
3. Disconnect connectors J202, J203, J206, J207, J208, J211, and the Fiber Optic Cable from the DC Controller PCA.
4. Loosen the screw (1) and remove the Thermistor Bypass Switch Actuator Plate from its plastic stanchion (located next to the Lower Cooling Fan).
5. Remove the screws (4) that secure the four corners of the DC Controller PCA.
6. Remove the long black screws (2) from each of the two large connectors on the DC Controller PCA.
7. Lift out the PCA, taking care not to damage it when disconnecting the two large connectors. The PCA should be carefully rocked back and forth to loosen the connectors.

When reinstalling the DC Controller PCA, be sure the connector pins are properly aligned and that no cables (particularly the Fiber Optic Cable) will be pinched before pressing the board into place. (Hint: Pushing down on the top of the connectors is the best way to reseat the board.) Also ensure jumper J209 is in place or intermittent hardware failure indications may result.

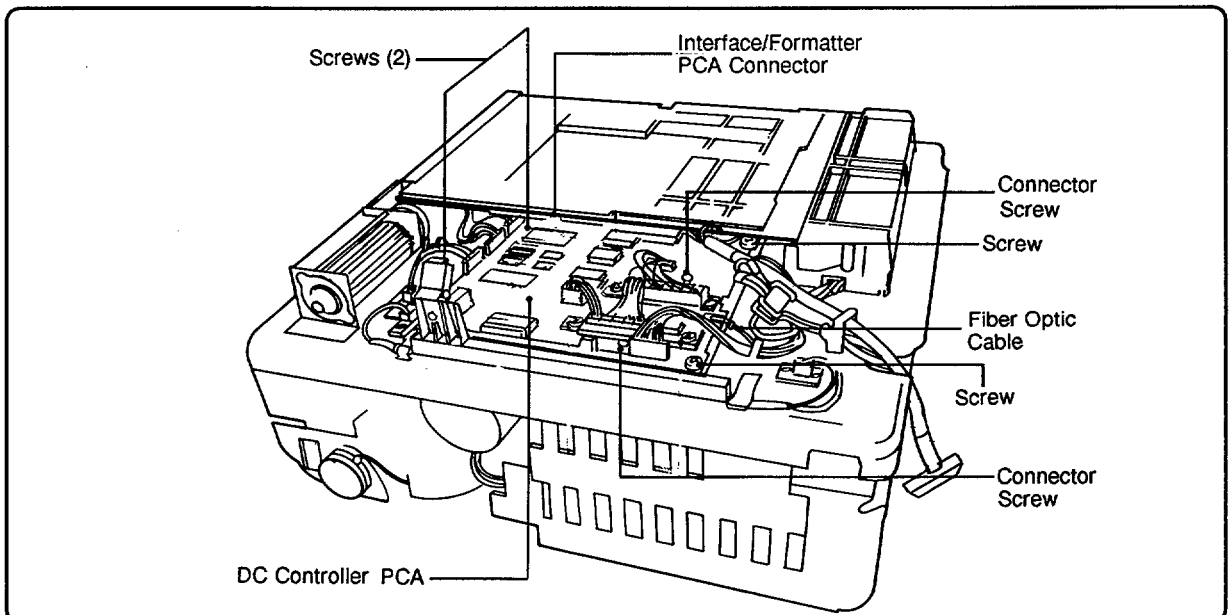


Figure 6-51. DC Controller PCA

TROUBLESHOOTING

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7-1. INTRODUCTION

This chapter was designed to provide the information necessary to quickly identify the cause of an HP 33440 or HP 33449 printer failure. Chapter organization is based upon three predominant sources of symptoms:

- Control Panel display messages.
- Print quality problems.
- Host/printer communication problems.

A series of flowcharts have been included to provide support personnel with a logical sequence of steps to verify proper printer operation. If a failure should be discovered through the verification procedure, the engineer can quickly find the appropriate section of Chapter 7 to identify the faulty component or assembly.

Once a defective printer component is identified as the cause of the failure, service personnel should reference Chapter 6 ("Removal and Replacement") to effect the repair. If the cause is not an internal printer component, this chapter should provide the information necessary to resolve the problem or, at a minimum, reference another appropriate section of the manual.

Section 7-2, "Pre-Troubleshooting Procedures," provides a preliminary checklist designed to assist the service representative in determining—over the telephone if possible—if a service call is necessary.

Section 7-3, "Main Flowchart," provides several flowcharts which give a step-by-step sequence of actions to take to verify proper printer operation.

Section 7-4, "Printer Message Troubleshooting," lists Control Panel messages, their causes, and the appropriate actions to take to respond to them.

Section 7-5, "Image Formation Troubleshooting," describes typical image formation and print quality problems and the steps to take to correct them.

Section 7-6, "Interface Troubleshooting," describes interface problems between the printer and its host system and the actions to take to correct these problems.

Section 7-7, "Troubleshooting Aids," provides additional troubleshooting material, including a print image repetitive defect ruler, connection diagrams, the main wiring diagram, followed by a listing and brief description of the signals illustrated in the diagram, and a signal timing chart.

7-2. PRE-TROUBLESHOOTING PROCEDURES

Preliminary Operating Checks

Prior to troubleshooting a specific printer problem, the service representative should ensure that:

1. The printer is installed on a solid, level surface (refer to Chapter 3, Section 3-2, of this manual).
2. The line voltage providing power to the printer does not vary more than 10% from the nominal rated value as specified on the Power Rating label.
3. The operating environment for the printer is within the temperature and humidity specifications listed in Chapter 1, Section 1-3, of this manual.
4. The printer is operated in a well-ventilated area.
5. The printer is not located in a hot or humid area (near water taps, boilers, or humidifiers), a cold area, near open flames, or in a dusty situation.
6. The printer is never exposed to ammonia gas such as that produced by diazo copiers or office cleaning materials.
7. The printer is not exposed to direct sunlight at any time during the day.
8. The customer is using media as specified in Chapter 2, Sections 2-4 through 2-6, of this manual.
9. The customer is not using a refilled EP-S Cartridge and has removed the EP-S Cartridge shipping seal.

Note



The printer's scanner motor and main motor start when the printer is switched on and every time the printer receives a print job. This explains the motor noise heard at these times. Also, about every 30 minutes the Main Motor rotates the Fusing Roller to make it last longer. This is a normal part of printer operation.

Pre-Troubleshooting Check List

The "Pre-Troubleshooting Check List" on the following page is designed to help resolve user-responsible problems before they become service calls.

Hint



Photocopy the "Pre-Troubleshooting Check List" and place it near your telephone for quick reference.

PRE-TROUBLESHOOTING CHECK LIST**Blank Display**

- Verify that power cord is firmly connected to both the printer and its power source. Remove any Optional I/O or memory PCAs.

Slow Printer

- The optimal eight-page-per-minute specification does not take into account data transfer time between the host and printer or the time required by the printer to format more complex data such as HP-GL/2 commands and scalable fonts. A complex page may take up to several minutes to format before printing. The READY indicator should flash while formatting.
- A Print Fonts routine involving scalable fonts (HP 33449 only) will typically cause delays of up to 30 seconds between pages.
- Because the HP 33449 self test involves font scaling and HP-GL/2 graphics, it will not run continuously at eight ppm.

Short EP-S Cartridge Life

- A new Hewlett-Packard EP-S Cartridge is rated for 4,000 letter-sized pages with average coverage (i.e., a double-spaced page) of five percent toner per page. Forms, graphics, and/or a density dial setting less than "5" will yield fewer pages.
- Paper with high surface abrasion (typical of a good writing or general purpose bond paper) can prematurely wear the surface of the EP drum. Recommend a good quality xerographic bond paper.

Font Cartridge Not Recognized

- Reinstall cartridge - push until it "clicks."

Print Quality Problems

- Thoroughly clean the printer (see User's Manual).
- Avoid poor quality or non xerographic paper and improper paper storage practices. Recommend use of high quality xerographic bond paper and proper storage per the User's Manual.

Black Pages (Undefined Border)

- Broken Primary Corona wire - replace the EP-S Cartridge.

Dark Streaks (or Lines) Down the Page

- Clean the Primary Corona wire with felt end of cleaning tool.
- Check the Fuser Cleaning Pad. If marks correspond to streaks, it may need replacement. Check any pre-printed forms for corresponding images.

Light Areas of Print (Blotches or Lines/Streaks Down the Page)

- Toner running low. Gently rock the EP-S Cartridge around its long axis to resolve temporarily. May require a new EP-S Cartridge immediately.
- Clean the Transfer Corona housing and wire.
- Improper paper storage and some types of paper will exhibit this problem. Recommend usage of high quality xerographic bond paper and proper storage techniques.

Smeared Print

- Paper with a surface texture that is too smooth will exhibit this problem.

Gray Background

- With envelopes and thick media, set the Print Density dial to a lower (darker) setting.
- Clean the Primary Corona wire with felt end of cleaning tool.

Partial Pages

- Set AUTO CONT = OFF in Configuration Menu and troubleshoot error message. If no message, probable cause is an application and/or printer setup problem.

Communication Problems

- If tied to an MS-DOS system, ensure the AUTOEXEC.BAT file properly reflects I/O configuration, via the MODE and COM commands, and reboot.
- Verify that a cable known to be good is securely installed between the host and printer -10' max. for parallel, 50' max. for RS-232.
- Verify that both the host system and printer Control Panel configurations match.
- Check that the application's printer configuration file has not been improperly modified or inadvertently purged.

02 WARMUP (Continuous)

- Can be caused by host interface or cabling problems, or improper use of the printer's interface ports. Remove I/O cables and power cycle the printer.

13 PAPER JAM Indications

- If media visibly jams, it may be unsuitable for the LaserJet printer. Try a reputable xerographic bond paper or other suitable media per Chapter 2 herein or Appendix D of the User's Manual.
- If using envelopes, ensure they meet specifications in Section 2-5 of this manual or Appendix D of User's Manual. Do not shuffle envelopes prior to loading in the input tray.
- Printer may require operator cleaning. (See User's Manual.)
- If all looks well but jam indication occurs just prior to delivery, host application and/or printer setup is probably at fault. Can occur if unexpected media size is placed in Manual Feed tray.

ERROR 20 (Memory Overflow)

- Insufficient printer user memory is available to format the current page. Additional user memory may be freed up by removing any soft fonts or macros. User may need to purchase additional memory.

ERROR 21 (Print Overrun)

- The current page is too complex to be printed in its entirety. On the HP 33440, the only solution is to simplify the page. With the HP 33449, accessory memory can be purchased and PAGE PROTECT (in the Configuration Menu) enabled.

ERROR 22 (I/O Configuration Error)

- Because printer and host are not handshaking properly, the printer's I/O buffer has overrun. Verify cabling per Appendix D, and the host's interface/configuration and the printer's Control Panel configuration.

ERROR 40 (Data Transfer Error)

- Printer is receiving data in an unrecognizable format, a common result of having powered down the host with the printer online. Also caused by nonmatching baud rates or host configuration other than an 8-bit -1 start/stop bit - no parity ASCII character.

Unexpected Results - No Failure Indication

- Most unexpected problems can be attributed to the host application or its use. The **Personal Peripherals Assist Line** is available free of charge to help the user through these problems at (208) 323-2551. Note that this is a toll call.

Figure 7-1. Pre-Troubleshooting Check List

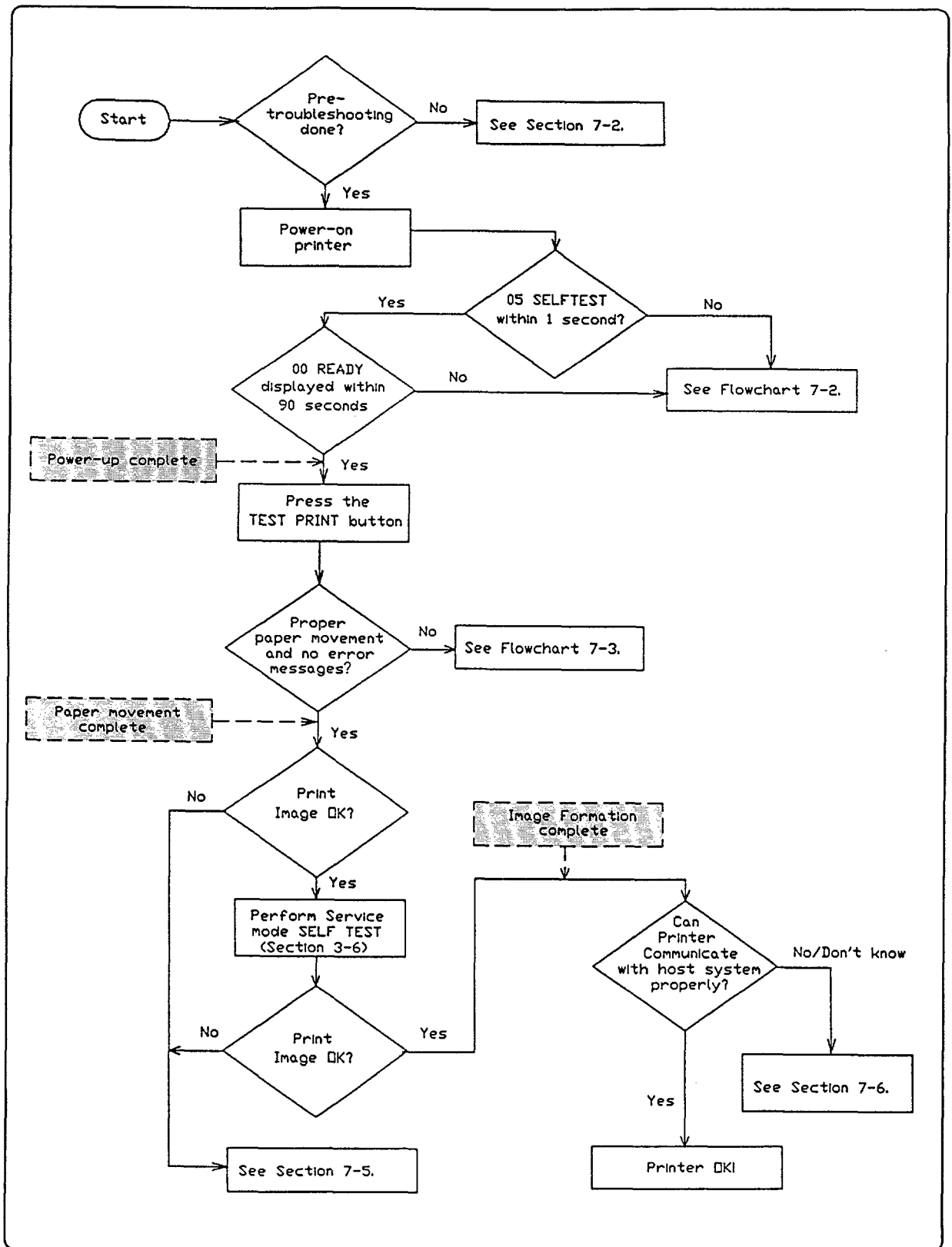
7-3. MAIN FLOWCHART

All troubleshooting should begin with Flowchart 7-1 which can be used to verify the major printer functions described in the table below:

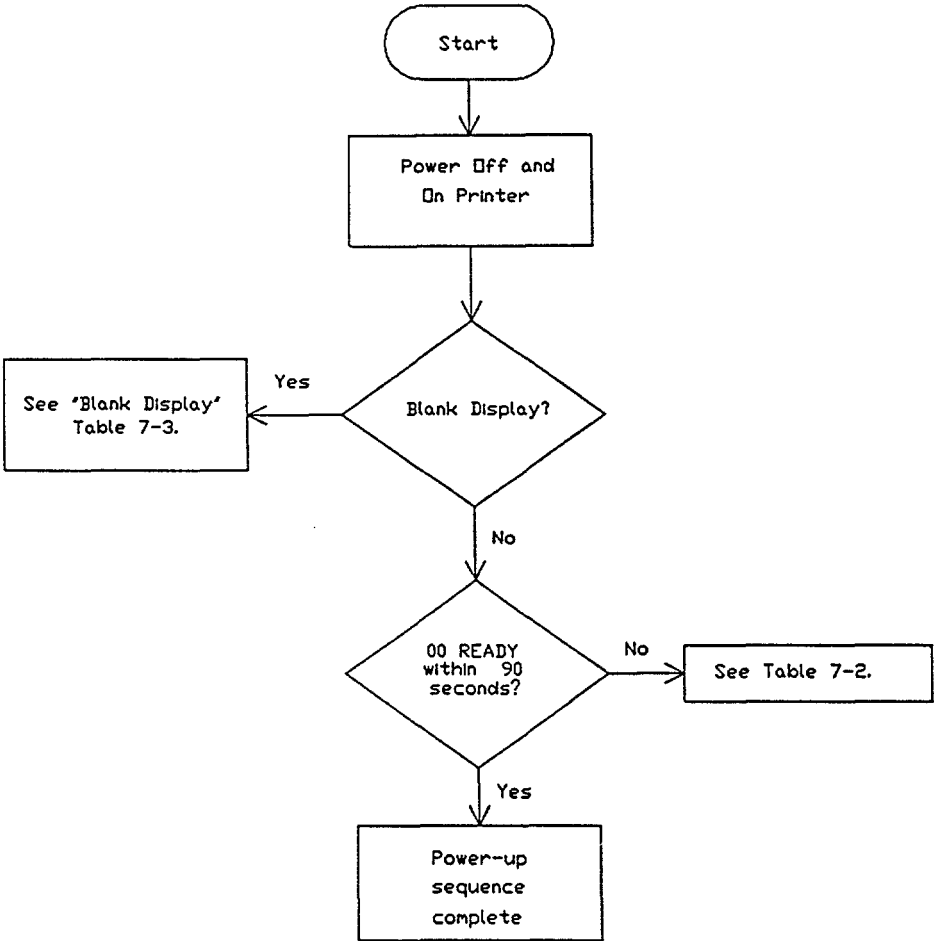
Table 7-1. Major Printer Functions

FUNCTION	DESCRIPTION
Power Up.	The powering up of the printer to the ready state following Self Test, and the distribution of DC voltages.
Paper Movement.	The printer's ability to successfully move media from the input tray to either the Face-Up or Face-Down (Top) Output Tray.
Image Formation.	The printer's ability to successfully generate a print image and transfer this image to various print media.
Communications.	The printer's ability to successfully communicate with its host system.

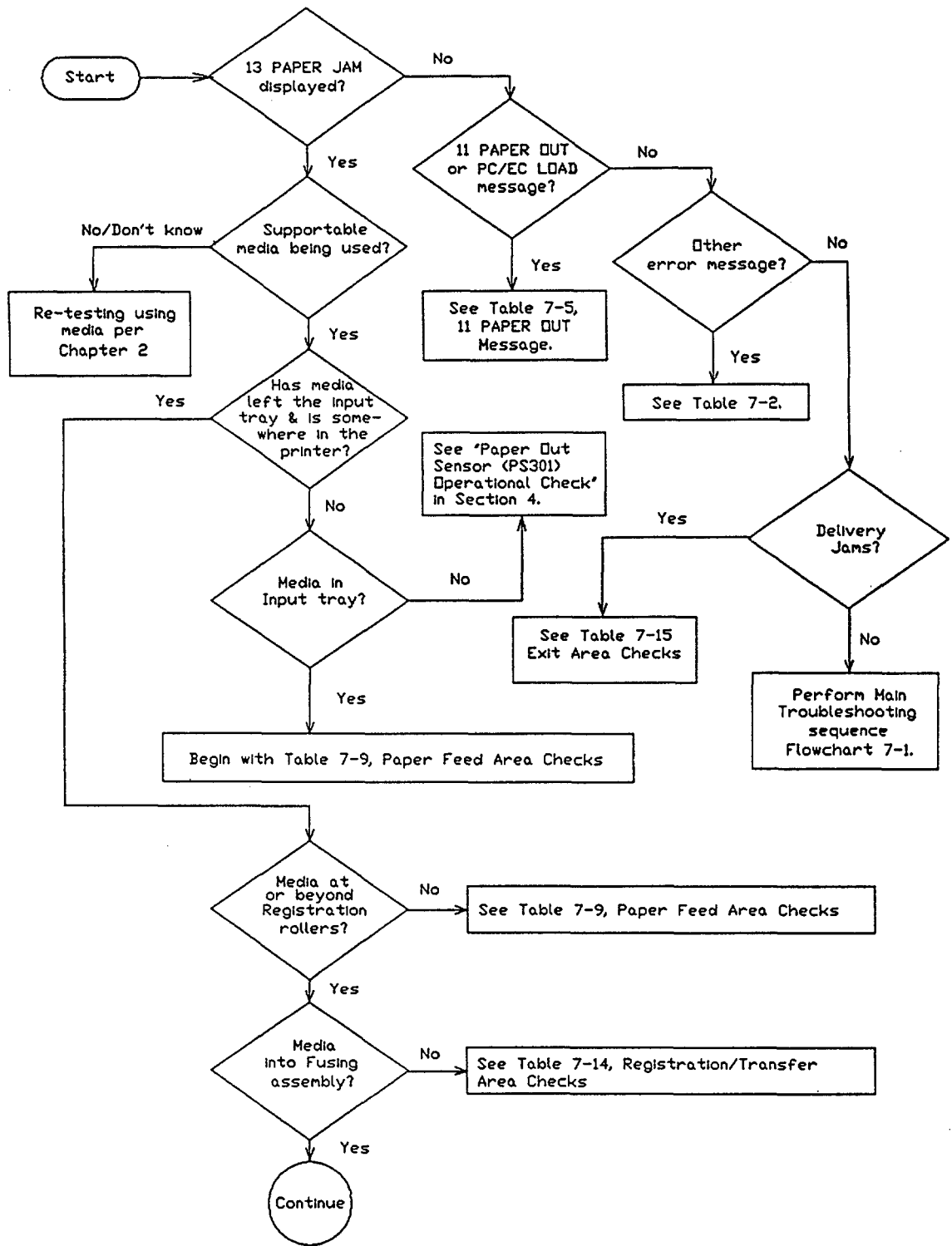
The service representative should work through the main flowchart sequentially, function by function, until all of the printer's major functions have been verified. Flowchart 7-2 (Power-Up Sequence) and Flowchart 7-3 (Paper Movement Sequence) should be used in conjunction with Flowchart 7-1. If a malfunction is encountered, the service person should branch to the specified section.



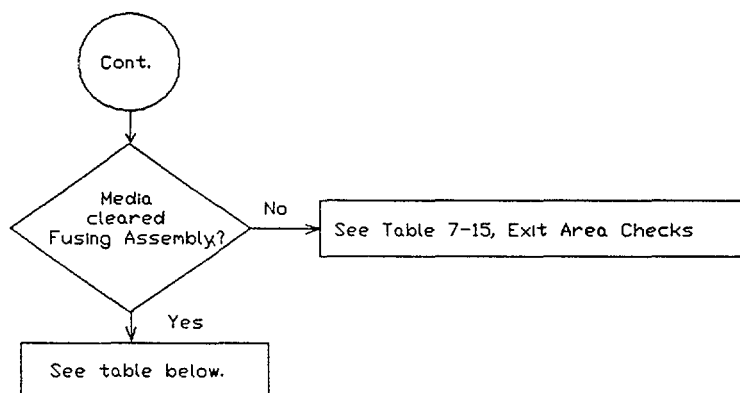
Flowchart 7-1. Main Troubleshooting Sequence



Flowchart 7-2. Power-Up Sequence



Flowchart 7-3. Paper Movement Sequence



Flowchart 7-3. Paper Movement Sequence (Continued)

Possible Paper Movement Sequence Problems

PROBLEM	ACTION
1. Wrong size (length) media being used.	Replace with correct size media.
2. Tray size sensing switches/tabs defective.	See "Tray Size Switches (SW201, SW202, SW203) Functional Check" in the following section.
3. Mechanical problem with Exit Sensor Flag.	See Table 7-15, "Exit Area Checks," in the following section.
4. Electrical problem with PS331.	See Table 7-16, "Paper Exit Sensor (PS331) Functional Check," in the following section.
5. Delivery jam.	See Table 7-15, "Exit Area Checks," in the following section.

7-4. PRINTER MESSAGE TROUBLESHOOTING

Message Summary Table

Table 7-2, “Printer Messages,” is a list of all status, attendance, error, and service messages affecting the HP 33440 and HP 33449 printers. HP 33449-specific messages are overprinted in color. When two items appear in the “MESSAGE” column, the first is the HP 33440 display message and the second is the HP 33449 display message. This list identifies the action required to correct the situation identified by the message.

Table 7-2. Printer Messages

MESSAGE	SITUATION DESCRIBED AND/OR ACTION REQUIRED
<i>Blank Display</i>	Refer to “Blank Display” section. (Table 7-3)
00 READY	Proceed; printer is ready to use.
02 WARMING UP	Wait until printer signals ready.
02 WARMING UP (Continuously)	Refer to “02 WARMING UP (continuous) Message” section. (Table 7-4)
04 SELF TEST	Continuous Self Test printing.
05 SELF TEST	Self Test in progress.
06 PRINTING TEST	Self Test printing.
06 FONT PRINTOUT	Printing sample characters from available fonts.
07 RESET	Returns all printer settings to Printing Menu settings and clears buffered pages, temporary soft fonts, and macros.
08 COLD RESET	Returns both Configuration and Printing Menu selections to the factory settings. See Chapter 3, Section 3-3.
09 MENU RESET	Returns all Printing Menu items to factory settings and clears buffered pages, temporary soft fonts, and macros. See Chapter 3, Section 3-3.
10 RESET TO SAVE (HP 33449 Only)	Press and hold RESET (until 07 RESET appears) to confirm the acceptance of Printing Menu selections (temporary fonts, macros and buffered data will be deleted), or press CONTINUE or ON LINE (no changes to any selections will be made at this time). See Chapter 3, Sections 3-3 and 3-4.
11 PAPER OUT (HP 33440 Only)	Add media to the input tray. If problem continues, refer to the “11 PAPER OUT Message” section. (Table 7-5)
12 PRINTER OPEN	Close the Top Cover Assembly. If problem continues, refer to the “12 PRINTER OPEN Message” section. (Table 7-7)
13 PAPER JAM	Open printer, clear any paper within the printer, and press CONTINUE or ON LINE to reprint the page. If problem persists, refer to “13 PAPER JAM Message” section. (Table 7-8)
14 NO EP CART	Install an EP-S Cartridge. If problem continues, refer to the “14 NO EP CART Message” section. (Table 7-17)

Table 7-2. Printer Messages (continued)



MESSAGE	SITUATION DESCRIBED AND/OR ACTION REQUIRED
15 ENGINE TEST	Engine test with printout produced by pressing the Test Print button.
16 TONER LOW	Replace EP-S Cartridge. If problem continues, refer to "16 TONER LOW Message" section. (Table 7-18)
17 MEMORY CONFIG (HP 33449 Only)	Indicates memory reconfiguration in operation as a result of setting Page Protection ON.
18 SKIP SELFTEST (HP 33449 Only)	Skips the ROM and RAM portions of the power on self test, activated by holding down the  key and powering on the printer. This should not be used as it compromises printer integrity. (Note: This is for manufacturing use only.)
20 ERROR 20 MEM OVERFLOW	<p>Indicates a memory overflow; too much data is being sent to the printer and the printer has run out of memory. Pressing the  key causes the printer to print only the information it has received.</p> <p>If the error persists, it may be necessary to <i>simplify</i> the print job (i.e., fewer fonts and less graphics information) or have the customer purchase additional memory.</p>
21 ERROR 21 PRINT OVERRUN	<p>Indicates that the information being sent to the printer is too complex for the printer (i.e., the formatting capabilities of the printer can not keep up with the formatting instructions being sent to it by the computer).</p> <p>If the error persists, it may be necessary to <i>simplify</i> the job (i.e., reduce the number of characters or different fonts used, reduce the number of pixels addressed or cursor repositions, or reduce addressing the same pixel location multiple times). With the HP 33449, this problem can also be resolved by adding at least one additional memory PCA and setting PAGEPROTECT=[LTR, LGL or A4].</p>
22 ERROR 22 I/O CNFIG ERR	<p>Indicates that the host computer and the printer are not communicating properly (i.e., the printer and computer baud rates may not match or the handshake protocol may be incompatible).</p> <p>Refer to Section 7-6, "Interface Troubleshooting."</p> <p>Note: The printer supports the XON/XOFF (DC1/DC3) and DTR (Data Terminal Ready) handshake protocols. Both signals are sent from the printer during data transmission. The Enquire/Acknowledge (Enq/Ack) protocol is not supported by this printer.</p>
40 ERROR	<p>Indicates that an error occurred during the transfer of data from the computer to the printer. Refer to Section 7-6, "Interface Troubleshooting," for help.</p> <p>Note: This error occurs if the computer is powered down while the printer is on line or when attempting to use baud rates which do not match.</p>

Table 7-2. Printer Messages (continued)

MESSAGE	SITUATION DESCRIBED AND/OR ACTION REQUIRED
41 ERROR	Indicates that a temporary error occurred in the printed page (see Table 7-20). If this error occurs, press the CONTINUE key and the printer will repeat the page. Refer to Table 7-20 ("41 ERROR Checks") in the "51 ERROR Message" section if the error persists. Note: This error most frequently occurs when a Beam Detect Error occurs. If the printer cannot correct the error condition after two seconds, a Beam Detect Malfunction (51 ERROR) will occur.
42 ERROR 42 OPT INTERFACE	Indicates a communications problem has occurred between the Interface/Formatter PCA and the optional interface. Press the CONTINUE key to resume printing. Reseat the Optional I/O PCA. If the error persists, refer to the documentation for the optional interface.
43 ERROR 43 OPT INTERFACE	Indicates a communications problem has occurred between the Interface/Formatter PCA and the optional interface. If the error persists, refer to the documentation for the Optional I/O PCA.
50 SERVICE	Power off the printer for a minimum of 10 minutes. If the problem continues, refer to the "50 SERVICE Fuser Malfunction" section. (Table 7-19)
51 ERROR	Indicates loss of laser beam for over 2 seconds. Refer to the "51 ERROR Message" section. (Table 7-21)
52 ERROR	Indicates scanner motor unable to maintain proper speed. Refer to the "52 ERROR Scanner Malfunction" section. (Table 7-22)
53 ERROR (HP 33440 only)	The 53 ERROR indicates that the optional memory installed in the printer is NOT compatible with the Interface PCA. Use HP memory only.
53-1 ERRORUNIT (HP 33449 only)	An error was detected on the optional memory card in the front (right) slot. Verify that the correct revision level ("B" or greater) of memory is installed in the printer.
53-2 ERRORUNIT (HP 33449 only)	An error was detected on the optional memory card in the rear (left) slot. Verify that the correct revision level ("B" or greater) of memory is installed in the printer. Use HP memory only.

Table 7-2. Printer Messages (continued)

MESSAGE	SITUATION DESCRIBED AND/OR ACTION REQUIRED
55 ERROR	<p>Indicates a communications problem between the DC Controller PCA and the Interface/Formatter PCA. Undefined status has been exchanged between the two PCA's or a status request has gone unanswered.</p> <p>Perform the Test Print operation to verify DC Controller functionality. If the message persists, check for any cable damage. If the message still persists, perform the following:</p> <ol style="list-style-type: none"> 1. Ensure J209 jumper is in place on the DC Controller. 2. Verify proper DC voltages per Figure 7-2, "J210 Location." 3. Replace the Interface/Formatter PCA.* 4. Replace the DC Controller PCA.* <p>*HP 33440AB/AU only: In some cases, both the DC Controller and Interface PCA will need to be replaced together. (See also Service Note 33440AB/AU-09.)</p>
57-1 ERRORUNIT (HP 33449 Only)	The memory card in the front (right) slot cannot be configured because it exceeds memory capacity.
57-2 ERRORUNIT (HP 33449 Only)	The memory card in the rear (left) slot cannot be configured because it exceeds memory capacity.
61 SERVICE	Indicates a checksum error was detected during Self Test in the Interface/Formatter PCA's program ROM. If the message persists, replace the Interface/Formatter PCA.
62 SERVICE	Indicates a checksum error was detected in the Interface/Formatter PCA's internal font ROM. If the message persists, replace the Interface/Formatter PCA.
63 SERVICE	<p>Indicates an error was detected in either the Interface/Formatter PCA's Dynamic RAM or an Optional Memory PCA (if installed). Remove any Optional Memory PCAs (if installed) and retest for the error.</p> <p>If the error message persists, replace the Interface/Formatter PCA.</p>
64 SERVICE	<p>Indicates a laser scan buffer error.</p> <p>Attempt to clear the error by power cycling the printer. If the error persists, replace the Interface/Formatter PCA.</p>
65 SERVICE	<p>Indicates a dynamic RAM controller error.</p> <p>Attempt to clear the error by power cycling the printer. If the error persists, replace the Interface/Formatter PCA.</p>
67 SERVICE	Indicates a miscellaneous hardware or address error on the Interface/Formatter PCA. Verify that all cables, font cartridges, and accessories are seated. If the error persists, replace the Interface/Formatter PCA.

Table 7-2. Printer Messages (continued)

MESSAGE	SITUATION DESCRIBED AND/OR ACTION REQUIRED
68 ERROR (HP 33449 Only)	<p>Indicates a <i>recoverable</i> error has been detected in NVRAM (Non-Volatile RAM). Press CONTINUE to clear, then verify the Control Panel menu settings: one or more menu items have been reset to their factory default settings during error recovery.</p> <p>If this condition persists, replace the Interface/Formatter PCA.</p>
68 SERVICE (HP 33440 and HP 33449) 68 READY/SERVICE (HP 33449 Only)	<p>Indicates a NVRAM (Non-Volatile RAM) <i>failure</i> has occurred requiring replacement of the Interface/Formatter PCA. The printer can be operated without NVRAM until that time. Press CONTINUE to clear the display. <i>All</i> Control Panel values are set to their factory default settings. The 00 READY message becomes 68 READY/SERVICE to remind the user of the problem.</p>
69 SERVICE	<p>Indicates a timeout error has occurred between the Interface/Formatter PCA and the Optional I/O PCA. Refer to the I/O Interface documentation.</p> <p>Remove the Optional I/O PCA and retest. If the message persists, replace the Interface/Formatter PCA.</p>
70 ERROR (HP 33449 Only)	<p>The firmware cartridge was not designed for this printer. Turn the printer OFF, then back ON. If the error persists, verify with the cartridge vendor whether the cartridge was specifically designed for this printer.</p>
71 ERROR (HP 33449 Only)	<p>The firmware cartridge was not designed for this printer. Turn the printer OFF, then back ON. If error persists, verify with the cartridge vendor whether the cartridge was specifically designed for this printer.</p>
72 SERVICE (HP 33449 Only)	<p>The font cartridge was removed too quickly after it was inserted. Turn the printer OFF, then back ON. This message can also result from a bad font cartridge or bad connectors on the Formatter PCA.</p>
79 SERVICE (HP 33449 Only)	<p>An unexpected error has been encountered. Document error message. Turn the printer OFF, then back ON. If the message persists, proceed as follows:</p> <p>Solid: Remove memory PCAs and font, macro, and personality cartridges one at a time. If the problem persists and the printer has an Optional I/O PCA installed, try a different interface (parallel or serial) if possible.</p> <p>If the problem continues, replace the Formatter PCA.</p> <p>Intermittent: Have the <i>customer</i> remove, for a period of time, any non-HP hardware/firmware products attached to the printer. If the problem continues during this test period, replace the Formatter PCA.</p> <p>Error message documentation should be returned with the defective component.</p>

Table 7-2. Printer Messages (continued)

MESSAGE	SITUATION DESCRIBED AND/OR ACTION REQUIRED
CONFIG LANGUAGE (HP 33449 Only)	This message is the result of holding down the (ENTER) key while powering on the printer. Following SELF TEST, the user will need to select the desired display language using the (+) , (-) , and (ENTER) keys.
EC LOAD [envelope size]	A user request has been made for an envelope size not currently installed in the printer or the tray is out of envelopes. Load the correct envelope in the envelope tray. Insert a loaded tray and select the loaded envelope size from the Control Panel or press (CONTINUE) to override. If the problem continues, see the "11 PAPER OUT Message" section. (Table 7-5) ([Envelope size] may be one of the following: COM10, MONARC, C5 or DL.)
PC LOAD [paper size]	This message is displayed whenever there is a user request for a paper size that is not currently installed in the printer (per the Tray Size switches) or the input tray is out of media. Insert the proper loaded tray into the printer or press (CONTINUE) to override. If the problem persists, see the "11 PAPER OUT Message" section. (Table 7-5) ([Paper size] may be one of the following: A4, EXEC, LETTER, or LEGAL.)
PE FEED [envelope size] or PE FEED ENVELOPE	A user request has been made to manually feed an envelope of the indicated size. Feed the envelope through the manual feed slot or press (CONTINUE) to feed from the tray. If the manual feed operation is not working as expected, perform the "Manual Feed Sensor (PS302) Functional Check" described in this section.
PF FEED [paper size]	A user request has been made to manually feed paper of the indicated size. Feed paper through the manual feed slot or press (CONTINUE) to feed from the tray. If the manual feed operation is not working as expected, perform the "Manual Feed Sensor (PS302) Functional Check" described in this section.
ENVELOPE=[env. size] (HP 33440)	This message is displayed whenever an envelope tray is inserted in the printer.
PE TRAY=[envelope size] (HP 33449)	The user must tell the printer what size envelopes are being used by scrolling through the choices (using the (+) and (-) keys) and pressing the (ENTER) key to make the new selection. Press (ON LINE) or (CONTINUE) to proceed. If an envelope tray is not being used when this message occurs, reseal the tray. If the problem continues, see "Tray Size Switches Functional Check" in this section. ([Envelope size] may be one of the following: COM10, MONARC, C5 or DL.)

Table 7-2. Printer Messages (continued)

MESSAGE	SITUATION DESCRIBED AND/OR ACTION REQUIRED
FC [LEFT/RIGHT/BOTH]	Font cartridge(s) were removed or replaced while the printer was off line and contained buffered data. Reinsert cartridge(s) and press the CONTINUE or ONLINE key. If the problem continues, try another font cartridge before replacing the Interface/Formatter PCA.
FC [LEFT/RIGHT/BOTH] NO FONT (HP 33449 Only)	Font cartridge(s) could not be read by the printer. Reinsert cartridge(s) and press the CONTINUE or ONLINE key. If the problem continues, try another font cartridge before replacing the Interface/Formatter PCA.
FE CARTRIDGE	A cartridge has been removed while the printer was on line. Turn printer OFF, reinsert the cartridge, and turn printer ON. If the problem continues, try another cartridge before replacing the Interface/Formatter PCA.

Blank Display

All information displayed on the printer's Control Panel is generated by the Interface/Formatter (I/F) PCA. The I/F PCA provides all voltages and display information to the Control Panel, and the Control Panel cable connects the Interface/Formatter PCA to the Control Panel.

A blank display panel is the result of one of the following malfunctions:

- Service Mode was initiated with no follow through.
- The printer *cannot* generate sufficient voltages to illuminate (enable) the display panel.
- The display panel, its related cabling, or its drive circuitry is defective.

Note



The test pattern produced by pressing the Test Print Button is exclusively created by the DC Controller PCA. The printer's Control Panel and Interface/Formatter PCA may be removed from the printer and the test would still be functional. If a print engine Test Print pattern can be created once the fuser reaches its operating temperature and all voltages are correct, the problem is more likely a defective Control Panel, Control Panel cable, or Interface/Formatter PCA.

Table 7-3. Blank Display

CHECKS	ACTION
1. Is the printer's ON/OFF switch set to ON?	Power ON printer.
2. Is AC power available at the input power receptacle?	Verify input power.
3. Is the power cord fully inserted in the rear of the printer?	Verify.
4. Is the Lower Cooling Fan operational? (Indicates +5 and +24A voltages are present.)	If no airflow can be detected at the lower right rear of the printer (below the Power Switch), proceed with the DC Voltage Functional Check which follows this table.
5. Are the +5V and GND screws on the Interface/Formatter PCA loose or missing?	Verify that screws are fully tightened and that voltage is available to the I/F PCA.
6. Are the display electronics malfunctioning?	Perform the following steps while power-cycling the printer: <ol style="list-style-type: none"> 1. Remove any I/O cables to the host system. 2. Reseat the Control Panel Cable. 3. Replace the Control Panel. 4. Replace the Interface/Formatter PCA. 5. Replace the DC Controller PCA. 6. Replace the Control Panel Cable.

DC Voltage Functional Check

The DC Power Supply Assembly receives AC voltage from the AC Power Module and converts this power into three DC voltage levels. The presence of these DC voltages may be checked at connector J210 on the DC Controller PCA (see Figure 7-2).

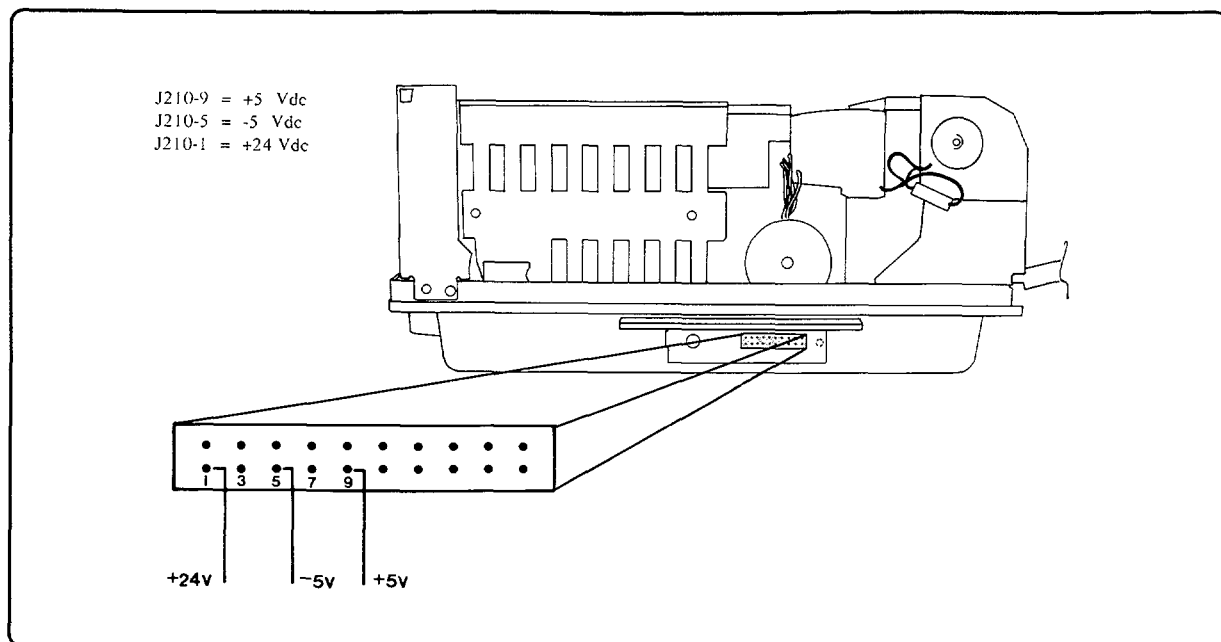


Figure 7-2. J210 Location

The J210 connector is located on the right side lower base of the printer next to the Test Print Button. Using a DVM, verify the +24, -5, and +5 voltages ($\pm 5\%$) are present at the specified pins using chassis ground as a reference.

If ALL of these voltages are missing:

1. Check Fuse F1 on the DC Power Supply Assembly. (See Figure 7-3.)
2. Ensure the proper AC Power Module and DC Power Supply Assembly are installed per the available AC line voltage.
3. Perform the "AC Power Functional Check" on the following page.

If ANY of these voltages are missing:

1. Ensure the proper AC Power Module and DC Power Supply Assembly are installed per the available AC line voltage.
2. Remove any accessory memory, font/firmware cartridges, or optional I/O.
3. Replace the DC Power Supply Assembly.
4. Replace the DC Controller PCA.

Note



The absence of any voltage may be the result of a defective component elsewhere in the printer. If this is suspected, disconnect one cable at a time from the DC Controller PCA and power cycle the printer until the voltage comes up. Use the printer wiring diagram (see Section 7-7) to then identify the defective assembly.

AC Power Functional Check

The AC Power Module distributes AC power to the DC Power Supply Assembly and to the Fusing Assembly. If *any* DC voltages are present in the printer, AC power is also present and the following procedures can be omitted.

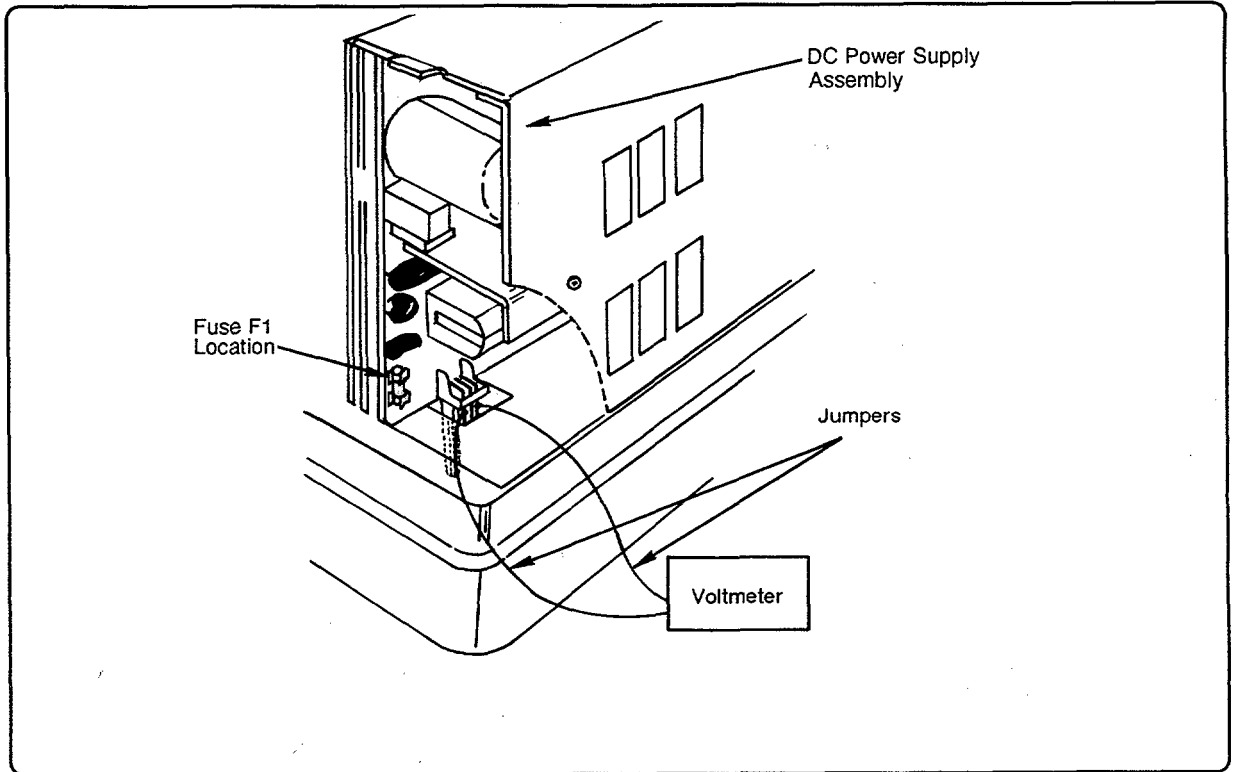


Figure 7-3. Fuse F1 Location

Verify that AC power is being input to the DC Power Supply Assembly as follows:

1. Power the printer OFF and remove the Main Body Covers.
2. Remove the printer's Front Support Plate. Connect a voltmeter to J502-1 and to J502-3 of the DC Power Supply Assembly (see Figure 7-3).
3. Power on the printer. If the expected AC line voltage is not present at this point, replace the AC Power Module or the cable between the two assemblies.

If line voltage is present, verify that Fuse F1 is not open. If Fuse F1 is good, the entire AC voltage path has been verified. Resume the DC Voltage Functional Check (see the previous page).

“02 WARMING UP” (continuous) Message

During normal operation, the printer displays a 00 READY message within 90 seconds of power-on. If the 02 WARMING UP message persists for longer than 90 seconds, check the following:

Table 7-4. 02 WARMING UP (continuous) Checks

CAUSES	ACTION
1. Are there host system interface problems?	Disconnect the interface cable from the printer, power printer OFF, then ON. May be caused by a parallel cable connected to a serial port or vice-versa, both serial and parallel cables attached, or a bad host interface.
2. Is J209 (jumper) installed on the DC Controller?	Install jumper.
3. Is the Control Panel cable fully connected?	Reseat/replace the Control Panel cable.
4. Is the Control Panel Assembly inoperative?	Replace the Control Panel Assembly.
5. Is the Interface/Formatter PCA inoperative?	Replace the Interface/Formatter PCA.

“11 PAPER OUT” Message**“PC/EC LOAD” Message**

Two conditions result in the 11 PAPER OUT (HP 33440) or PC LOAD [paper size]/EC LOAD [envelope size] (HP 33449) messages; first, the absence of the input tray and, second, the absence of media in the tray. The tray is sensed as the tray identifier tabs contact one or more of the three tray identifier microswitches in the tray input cavity of the printer. Under normal conditions, the PC/EC LOAD message is also generated when a paper or envelope size other than what is loaded in the printer is called for by the user or software.

The Paper Sensing Arm is located in the paper input area of the printer. During normal operation, the Paper Sensing Arm flag rests on the media installed in the paper tray. The Sensing Arm flag is attached to a shaft. The opposite end of the shaft is a photointerrupter that rotates through the PS301 (paper out) and PS302 (manual feed) sensors on the Paper Control PCA.

When the tray is empty, the Paper Sensing Arm flag swings through an opening in the base plate of the tray, allowing the photointerrupter to rotate and block sensor PS301.

The same Paper Sensing Arm is also used for manual feed operation. When media is inserted in the manual feed slot atop the input tray cover, the photointerrupter rotates toward the rear of the printer and blocks sensor PS302 on the Paper Control PCA. This indicates to the DC Controller PCA that media is in position for manual feed.

Note

The following checks are applicable to both “false paper out” or “undetected paper out” conditions. The undetected paper out condition will normally result in a 13 PAPER JAM error with no paper in the input tray.

Table 7-5. "11 PAPER OUT" or "PC/EC LOAD" Message Checks

CHECKS	ACTION
1. Is there any media in the paper tray?	Install media.
2. Is the proper paper tray fully inserted in the printer?	Push the tray into the printer until it contacts the tray identifier microswitches.
3. Are any of the tray identifier protrusions broken on the paper tray?	Inspect the tray for damage. If damaged, replace the tray. (See Figure 7-5.)
4. Is the Paper Sensing Arm broken? (See Figure 7-4.)	Inspect the arm for damage; if broken, replace the arm.
5. Is anything hindering the Paper Sensing Arm movement?	Verify that the Sensing Arm swings through its full range of motion. Ensure the routing of various cables does not hinder Paper Sensing Arm movement. It may be necessary to remove the DC Power Supply Assembly to closely inspect the arm's motion.
6. Is sensor PS301 on the Paper Control PCA functional?	See the PS301 Functional Check which follows.
7. Are all paper tray size sensing microswitches functional?	See "Tray Size Switches (SW201, SW202, SW203) Functional Check" which follows.
8. Does the Control Panel's Paper/Envelope setting match the tray being used?	Correct setting to match tray type.
9. Is the expected tray size being called for?	Check the software application.
10. Is the READY indicator flashing?	Wait for a change in the display message after it stops flashing.

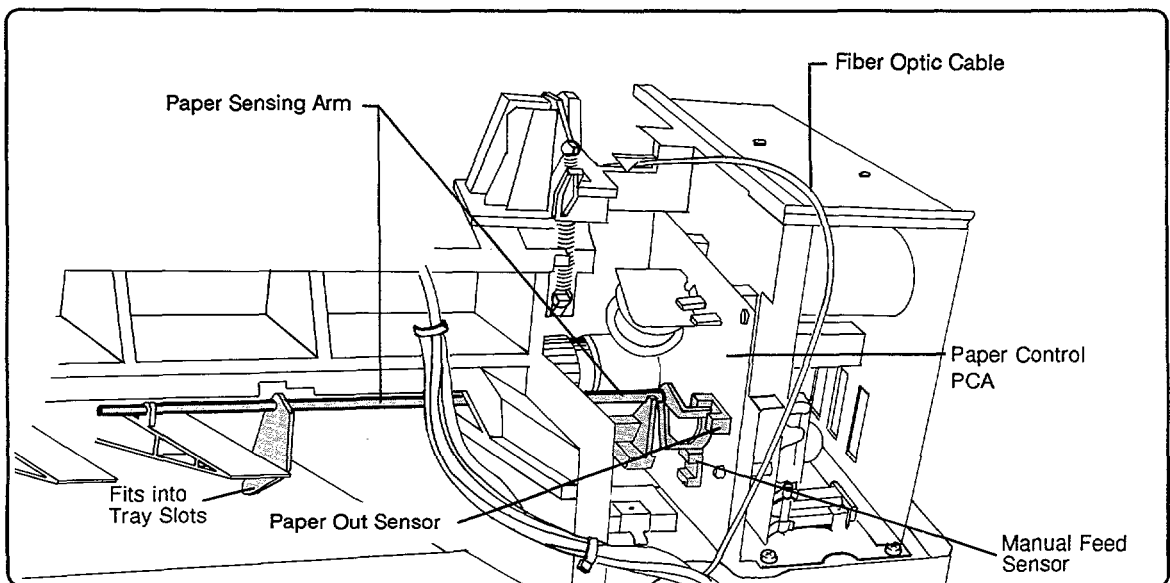


Figure 7-4. Paper Sensing Arm

Paper Out Sensor (PS301) Functional Check

To check the functional operation of the Paper Out Sensor (via the Control Panel display), proceed as follows:

1. While the printer is ON and not in Manual Feed mode (i.e., Manual Feed indicator off), remove the input tray from the printer.
2. With one hand, PUSH on the left-most paper tray identifier switch (SW203), being careful not to push the Sensing Arm flag at this time. (See Figure 7-5.)

If the printer returns to the READY state at this point:

- a. Replace the Paper Control PCA (PS301).
 - b. Replace the DC Controller.
3. With the other hand, PULL the Paper Sensing Arm flag toward the *front* of the printer while observing the printer's display.

If PS301 is functioning correctly, the display will alternate from PC/EC LOAD [size] or 11 PAPER OUT to 00 READY as the Sensing Arm is moved.

If the display does not alternate, the fault is either a bad Paper Control PCA (PS 301) or a bad DC Controller PCA.

Manual Feed Sensor (PS302) Functional Check

To check the operation of PS302 (the Manual Feed sensor) via the Control Panel display, proceed as follows:

1. After powering up the printer with 00 READY in the display, change menu item MANUAL FEED= to ON and PAPER= to LETTER (HP 33449 only). (On the HP 33440, remember to toggle through the remaining menu items, then hold down the **CONTINUE/RESET** key until 07 RESET appears in the display in order for the menu change to take effect.) The MANUAL indicator should now be ON.
2. Take the printer off line and remove the input tray. Note that the printer should remain in a READY state at this point.
3. Press the **PRINT FONTS** key. The FORM FEED indicator should be ON and the 06 FONT PRINTOUT message should be followed by a PF FEED LETTER message.
4. With one hand, PUSH on the left-most tray identifier switch (SW203), being careful not to push the Sensing Arm Flag at this time (see Figure 7-5). If the pickup roller begins to move at this point:
 - a. Replace the Paper Control PCA (PS302).
 - b. Replace the DC Controller PCA.
5. With the other hand, PUSH the Paper Sensing Arm flag toward the *rear* of the printer. If the Pickup Rollers do not move at this point:
 - a. Replace the Paper Control PCA (PS302).
 - b. Replace the DC Controller PCA.

Tray Size Switches (SW201, SW202, SW203) Functional Check

The paper tray size microswitch levers are located on the lower right side of the paper tray cavity. The microswitches indicate the presence and size of the installed paper tray to the DC Controller. The switches are activated by protrusions located on the rear of the paper tray. When the tray is inserted, the protrusions activate (engage) the microswitches (refer to Figure 7-5 below.)

Table 7-6. Configuration of Tray Size Sensing Switches

Paper Tray Size	SW203	SW202	SW201
Executive	ON	ON	ON
A4	ON	ON	OFF
Legal	OFF	OFF	ON
Envelope (Size set via Control Panel)	OFF	ON	ON
Letter	ON	OFF	OFF
No Tray Installed	OFF	OFF	OFF
Note: ON = Engaged			

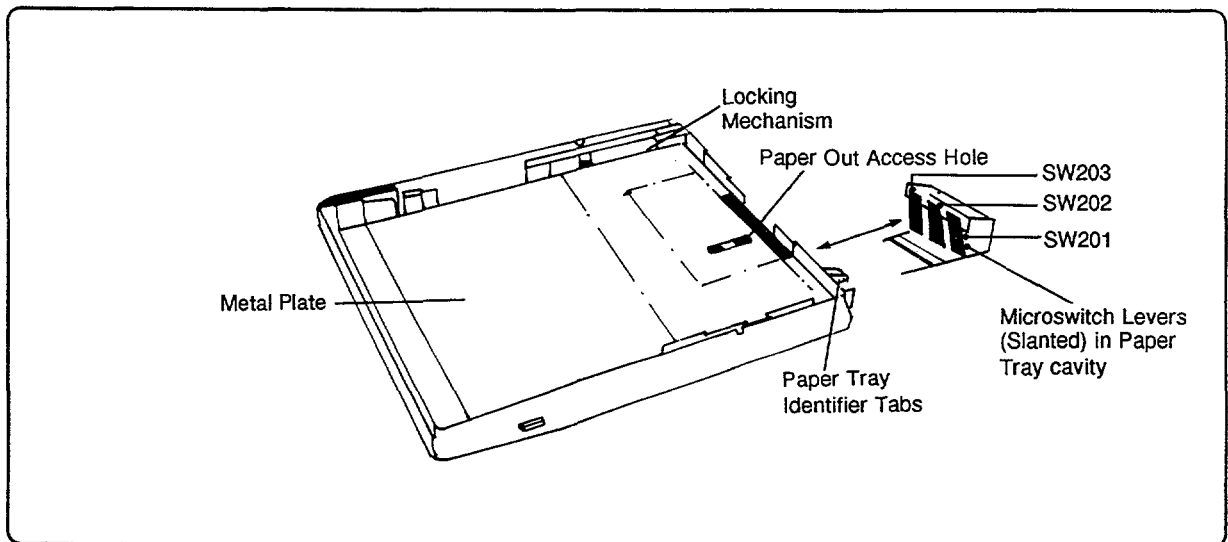


Figure 7-5. Tray Size Sensing Microswitches Locations

Operational Check

To check the operation of these switches (via the printer's Control Panel display), perform the following:

1. Power on the printer and allow it to warm up (to 00 READY). Remove the paper tray and ensure printer is not in the Manual Feed mode.
2. With one hand, PULL forward on the Paper Sensing Arm.

3. With the other hand, PUSH switch SW203 (the left-most microswitch) while observing the Control Panel display. (See Figure 7-5).
4. When the switch is functioning properly, the display will change to 00 READY.
5. Repeat above procedure, but push switch SW201 (the right-most microswitch). The display should change to 00 READY.
6. Repeat above procedure, but push switches SW202 and SW201 (the right two switches) simultaneously. The display should change to ENVELOPE=[size] (HP 33440) or PE TRAY=[size] (HP 33449).

If the display does not change as specified, replace the DC Controller PCA or the switch lever arms as appropriate.

Electrical Check

A continuity check can be performed on these switches on the DC Controller PCA.

"12 PRINTER OPEN" Message

The 12 PRINTER OPEN error indication tells the operator to close the printer's Top Cover Assembly. The DC Controller PCA detects this condition due to the absence of the +24B Vdc supply. When the printer's Top Cover Assembly is closed, a protrusion on the cover extends into the DC Power Supply Assembly and closes the switch within this module. The closing of this switch provides +24B Vdc to the DC Controller PCA. On the DC Controller PCA, the +24B Vdc power is distributed to the High-Voltage Power Supply Assembly and to a +3.2 Vdc regulator on the PCA. The output from the +3.2 Vdc regulator is the power source for digital-to-analog circuitry on the DC Controller PCA.

Table 7-7. "12 PRINTER OPEN" Checks

CHECKS	ACTION
1. Is the Top Cover Assembly open?	Ensure the Top Cover Assembly is firmly closed.
2. Is the protrusion on the Top Cover Assembly which activates the DC Power Supply microswitch missing or broken?	Visually inspect. Correct if missing or broken.
3. Is the printer plugged into the correct power source?	Verify printer power rating. Refer to Chapter 1, Section 1-2, of this manual. Note: Plugging a 220 V model printer into a 120 V voltage source will result in a 12 PRINTER OPEN error.
4. Is the DC Power Supply Assembly correctly seated into its connectors on the DC Controller PCA?	Visually inspect. Reseat module if necessary.
5. Is the DC Power Supply Assembly defective?	See the "+24B Vdc Electrical Check" following.
6. Is the DC Controller PCA defective?	See the "+24B Vdc Electrical Check" following.

+24B Vdc Functional Check

For an explanation of the source of the +24B Vdc power, read the overview for the "12 PRINTER OPEN" message on the previous page.

To verify if the +24B Vdc power supply is functional, proceed as follows:

1. Remove the access cover(s) to the test connector (J210, next to the Test Print Button).
2. Using a voltmeter with frame ground as a reference, monitor the voltage at J210-11 while manually activating the printer Top Cover Assembly closed microswitch (see Figure 7-6 and Figure 7-7). The measured voltage should toggle from zero to +3.2 Vdc ($\pm 5\%$) as the switch is activated. If the voltage is present, yet the message persists, replace the DC Controller PCA.

If the voltage is not present, +24B Vdc ($\pm 5\%$) can be measured at J212-13 (bottom cover must be removed) while activating the Top Cover Assembly closed microswitch (see Figure 7-6).

If +24B is not present, replace the DC Power Supply Assembly. If +24B is present but +3.2 V is not, the DC Controller PCA is defective.

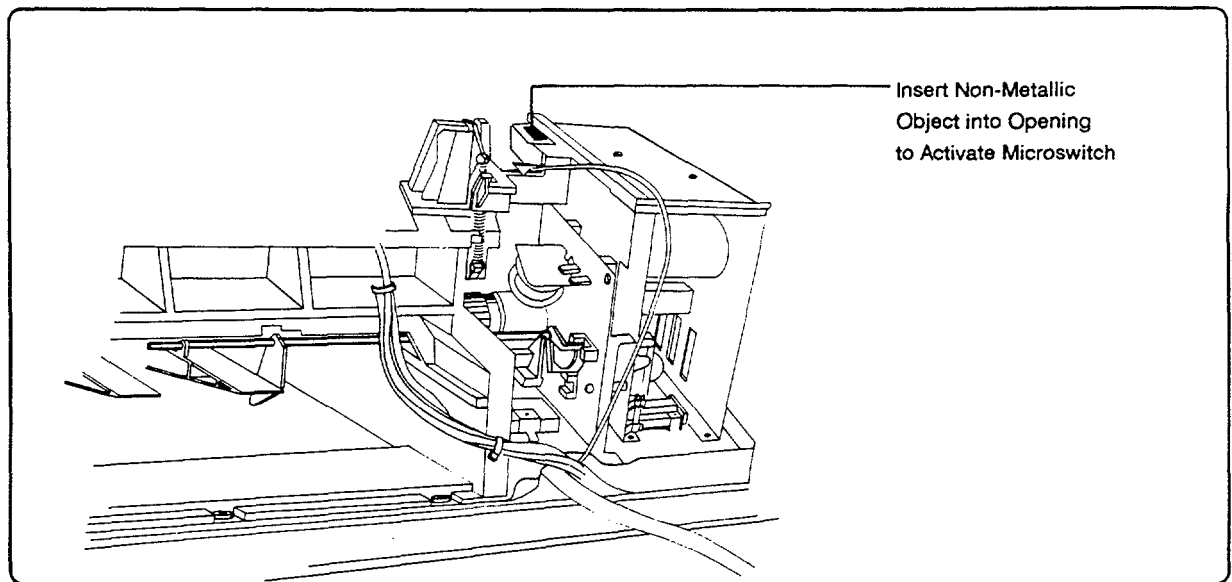


Figure 7-6. Defeating the Top Cover Assembly Microswitch

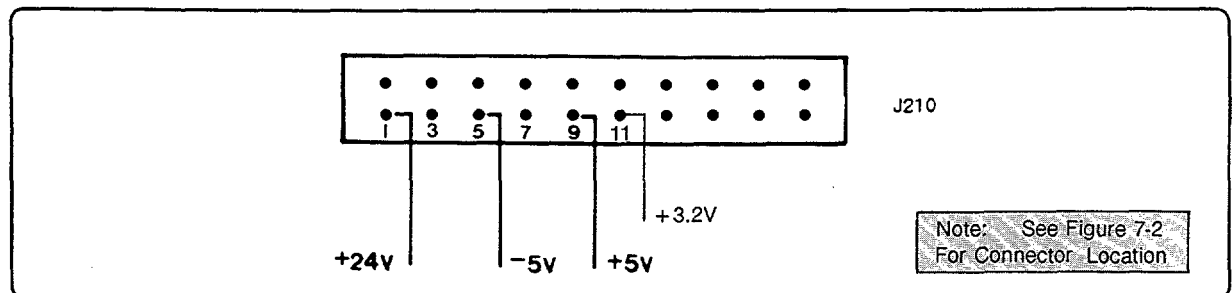


Figure 7-7. J210 Test Connector Test Point

“13 PAPER JAM” Message

To better understand the components involved with paper movement through the printer, refer to Figure 7-8 and the accompanying descriptions. To verify proper paper movement, refer to Flowchart 7-3 (Paper Movement Troubleshooting Flowchart).

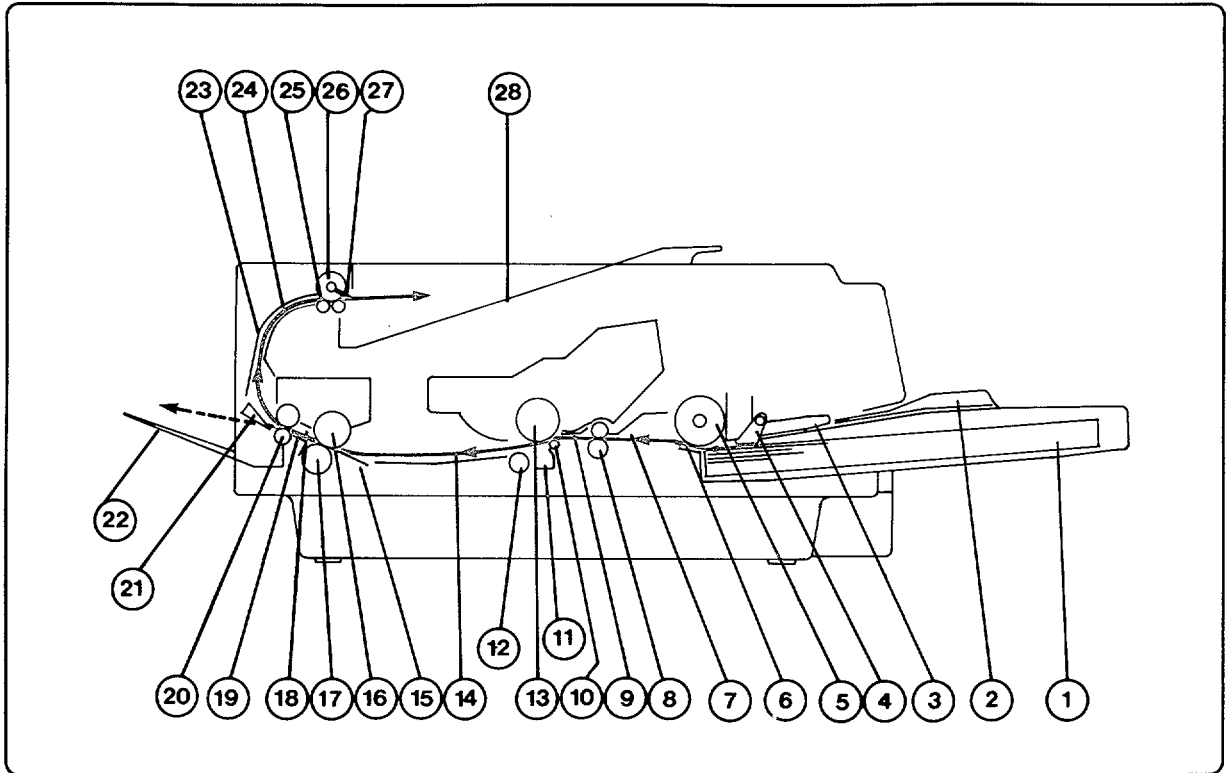


Figure 7-8. Paper Path vs Paper Sensors

Paper Path Components and Functions (refer to Figure 7-8):

Item	Description
1. Paper Tray.	Contains paper to be printed.
2. Manual Feed Input Tray.	Located on the lid of the Paper Tray; adjustable for various widths of paper.
3. Auxiliary Paper Guide.	Guides paper to the Paper Pickup Roller.
4. Paper Sensing Arm.	Used for detecting paper during manual feed and for detecting out of paper conditions.
5. Paper Pickup Roller.	Makes one rotation during paper feed process to advance paper to the Registration Rollers.
6. Separation Pad.	Works in conjunction with the Paper Pickup Roller to ensure that only one sheet of paper is fed to the Registration Rollers.
7. Paper Guide.	Guides paper toward the Registration Rollers.
8. Registration Rollers.	Temporarily holds paper until the leading edge is aligned with the image on the EP-S Cartridge's photosensitive drum.

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- | | |
|--|--|
| 9. Transfer Guide. | Guides paper onto the Transfer Corona. |
| 10. Transfer Roller. | Assists in moving paper onto the Transfer Corona. |
| 11. Transfer Corona and Static Teeth Assembly. | Provides a positive charge to transfer the electrostatic toner image to the paper and help separate the paper from the drum. |
| 12. Feed Roller. | Advances paper onto the Feed Guide Assembly. |
| 13. Photosensitive Drum. | Creates and holds the electrostatic toner image. |
| 14. Feed Guide Assembly. | Guides paper toward the Fusing Assembly. |
| 15. Fuser Feed Guide. | Guides the paper toward the Fusing Roller. |
| 16. Upper Fusing Roller. | Provides heat to fuse the toner image to paper. |
| 17. Lower Pressure Roller. | Provides pressure to ensure the toner image is permanently fused to paper. |
| 18. Fuser Exit Paper Guide. | Guides paper between the fuser pick-off pawls (claws) and the fuser delivery rollers. |
| 19. Paper Exit Sensor. | Detects the presence of paper in the Fuser Assembly. |
| 20. Fuser Delivery Rollers. | Assists paper in exiting the Fuser Assembly. |
| 21. Deflectors. | Deflects paper exiting the fuser to either the Face-Up (Rear) Output Tray or the Face-Down (Top) Output Tray. |
| 22. Face-Up Output Tray. | Allows paper to stack face-up in reverse order, minimizing curvature produced by the paper path. |
| 23. Exit Area Paper Guide (Upper). | Guides paper to the Face-Down (Top) Output Tray. |
| 24. Exit Area Paper Guide (Lower). | Guides paper to the Face-Down (Top) Output Tray. |
| 25. Exit Delivery Rollers (Lower). | Delivers paper the Face-Down (Top) Output Tray. |
| 26. Exit Delivery Rollers (Upper). | Delivers paper the Face-Down (Top) Output Tray. |
| 27. Static Charge Eliminator. | Removes residual static charges from the paper. |
| 28. Face-Down Output Tray. | Stacks output in correct order, but face down. |

Paper Jam Detection

Any paper movement problem normally results in a paper jam indication. All paper jam detection centers around the Paper Exit Sensor (PS331) on the Thermistor/Exit Sensor PCA being interrupted by the Exit Sensing Arm photointerrupter on the Fusing Assembly. This sensor detects the presence or absence of paper and inputs this information to the main DC Controller microprocessor where it is stored in memory. From this information, the microprocessor determines when a paper jam has occurred. The following conditions result in a paper jam:

1. When paper does not reach the Fusing Assembly within a specified time.
2. When paper does not clear the Fusing Assembly within a specified time (dependent upon current paper size as determined by SW201, SW202, and SW203 on the DC Controller PCA).
3. When paper is present in the Fusing Assembly at printer power ON and the fuser temperature is lower than 150° C.

To effectively troubleshoot a paper jam problem, the position of the leading and lagging edges of the media must be noted. The rest of this section is subdivided according to the position of any jammed paper (or other media) in the printer.

Table 7-8. "13 PAPER JAM" Checks

CHECKS	ACTION
1. Is there media in the input tray?	If not, refer to "Paper Out Sensor (PS301) Functional Check" earlier in this section.
2. Does the error occur at initial power-on or whenever the Top Cover Assembly is closed?	If so, clear any media from the Fusing Assembly. If the problem persists, see Table 7-16, "Paper Exit Sensor (PS331) Check."
3. Can the printer support the media being used?	Retest using supportable media. (See Chapter 2 for media information.)
4. Does the leading edge of the media reach the Registration Rollers?	If not, begin with Table 7-9, "Paper Feed Area Checks."
5. Does the media enter the Fusing Assembly?	If not, see Table 7-14, "Registration/Transfer Area Checks."
6. Does the media actually (visibly) jam after reaching the Fusing Assembly?	Yes: See Table 7-15, "Exit Area Checks." No: <ol style="list-style-type: none"> 1. If using the Manual Feed slot, ensure the proper size paper is being used. 2. Perform "Tray Size Switches (SW201, SW202, SW203) Functional Check" earlier in this section. 3. See Table 7-16, "Paper Exit Sensor (PS331) Check."

Hint

Paper movement through the printer can be visually observed by initiating a TEST PRINT operation with the Top Cover Assembly open. To do this, open the Top Cover Assembly and defeat the Top Cover Interlock Switch. With one hand, hold down one of the Drum Sensitivity Microswitches (see Figure 7-17) and, with the other, press the TEST PRINT button on the lower right side of the printer. This should feed paper up to the point it enters the Fusing Assembly. By holding down the fusing system drive lever (see Figure 7-15), the paper will continue through the Fusing Assembly as well. Note that there will be a momentary pause in paper movement, followed by an ERROR 51 indication. This is normal operation since the Laser Shutter Arm, normally engaged by the EP-S Cartridge, does not allow laser light to reach the beam detect cable.

Paper Feed Area Checks

The following procedures are designed to help identify any component(s)—from the Input Tray to the Registration Rollers—that are failing or marginal, causing paper feed problems that result in a “13 PAPER JAM” indication.

Table 7-9. Paper Feed Area Checks

CHECKS	ACTION
1. Is the Main Motor Functional?	See Table 7-10, “Main Motor Checks.”
2. Is the Paper Tray defective?	See Table 7-11, “Paper Tray Checks.”
3. Is the Paper Pickup Solenoid (SL301) operational?	See Table 7-12, “SL301 Checks.”
4. Are the Feed Roller and Separation Pad Assemblies operational?	See Table 7-13, “Paper Feed Mechanical Checks.”

Main Motor (M1) Functional Check

The Main Motor drives all moving components in the paper path (see Chapter 5, Section 5-3, Figures 5-13 and 5-15). The printer's Main Motor is a four-phase stepping motor controlled by the submicroprocessor on the DC Controller PCA. Motor operation begins when the Print (PRNT) signal is generated by the main microprocessor on the DC Controller PCA. Four output control signals from the DC Controller PCA (A, \bar{A} , B, and \bar{B}) are input to the DC Power Supply Assembly and are used to control the Main Motor. During normal operation, the Main Motor is enabled three seconds prior to paper being delivered to the Registration Rollers. The Main Motor remains enabled until all printing is completed and all paper has been moved to the output tray.

The Main Motor, under normal conditions, is driven for one second at printer powerup.

Table 7-10. Main Motor Checks

CHECKS	ACTION
1. Is the Main Motor connector firmly seated into J3 on the DC Power Supply Assembly?	Visually inspect. Reseat connector if necessary.
2. Is the DC Power Supply Assembly correctly seated into its connector.	Visually inspect. Verify that all pins are making contact with their connectors and that no pins are bent or damaged.
3. Is the DC Power Supply Assembly defective?	See the following Functional Check.
4. Is the Main Motor defective?	See the following Functional Check.
5. Is the DC Controller PCA defective?	See the following Functional Check.

To verify that the Main Motor is operational, perform the following:

1. With the printer powered ON, open the printer Top Cover Assembly.
2. Defeat the Top Cover Assembly Interlock and EP-S Cartridge Installed/Drum Sensitivity Microswitches.
3. Press the TEST PRINT button and observe the Main Motor and the gear train.

If the fuser temperature is greater than 150° C (00 READY on Control Panel), motor operation begins as soon as the Test Print button is pressed. If the Main Motor is not operating, change the following assemblies in the order listed:

1. DC Power Supply Assembly.
2. Main Motor.
3. DC Controller PCA.

Note



If the Test Print button does not appear to be operational, ensure that Manual Feed has not been selected (i.e., set to ON) and that the fuser is warmed up (00 READY on the Control Panel display).

Paper Tray Checks

The following table describes checks for potential paper tray problems.

Table 7-11. Paper Tray Checks

CHECKS	ACTION
1. Is there too much paper in the paper tray?	If there is too much paper in the tray, unnecessary pressure may be placed on the Paper Pickup Roller resulting in a paper jam. Remove the excess paper. (Note: This condition may have permanently damaged the Pickup Roller clutch.)
2. Is the paper tray fully inserted in the printer?	Push the paper tray fully into the printer. If the tray is not square with the printer, remove the tray, locate the problem, and correct it.
3. Is the paper tray lid fully seated on the main body of the paper tray?	Seat the paper tray lid.
4. Does the metal plate (bottom of tray) move up and down freely?	With the tray removed from the printer, verify that nothing is hindering the tray plate's movement. If the plate does not move freely, replace the tray.
5. Does the printer's lift mechanism lift the tray's metal plate up when the tray is installed in the printer?	While installing the tray in the printer, observe if the plate moves up, positioning the paper against the Paper Pickup Roller. If the lift mechanism does not lift the paper, correct or replace the mechanism.
6. Are any of the tray identifier protrusions broken?	Examine the tray for damage (refer to Figure 7-9). If any protrusion is broken, replace the tray.
7. Are any of the tray identifier microswitch levers damaged?	Examine the paper tray cavity in the printer for microswitch lever damage (refer to Figure 7-9). If the levers are damaged, replace them.

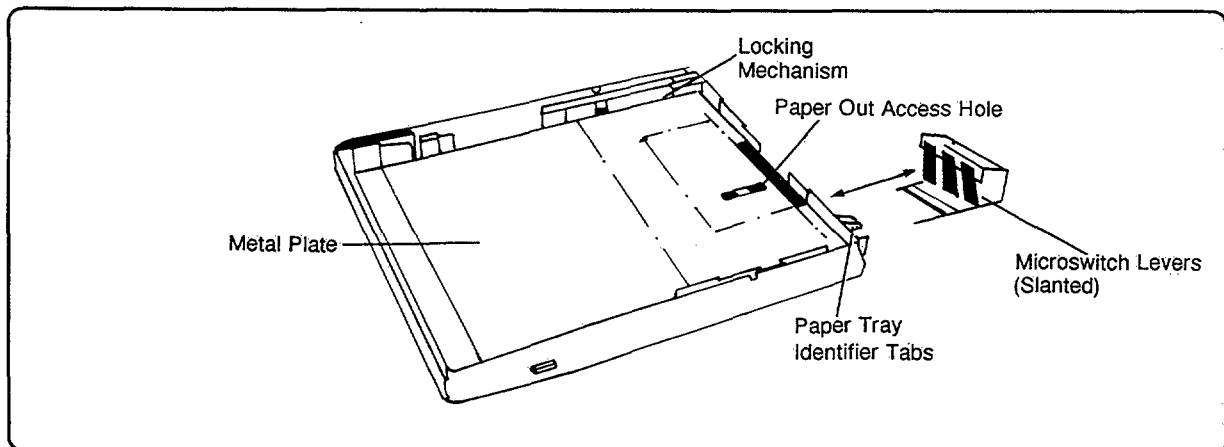


Figure 7-9. Paper Tray

Paper Feed Mechanical Checks

The purpose of solenoid SL301 is to allow the Paper Pickup Roller to pick one sheet of paper from either the paper tray or the manual feed tray and advance the paper to the Registration Rollers. Since the Registration Rollers are not turning at this time, the paper will be bowed slightly as it enters the Registration Rollers (see Figure 7-11).

Paper pickup operation is initiated by the DC Controller's main microprocessor. The Cassette Pickup Drive (CPUD) signal from the microprocessor energizes the pickup solenoid (SL301) (see Figure 7-10). The energizing of the solenoid engages the paper pickup clutch. The engaging of the clutch allows the Paper Pickup Roller to make one rotation, picking up one sheet of paper and advancing the paper to the Registration Rollers. The Separation Pad acts to prevent more than one page being advanced to the Registration Rollers should more than one piece of paper leave the input tray.

HINT



If an overfilled paper tray results in subsequent paper jams, the Feed Roller Assembly has probably suffered permanent damage and will require replacement.

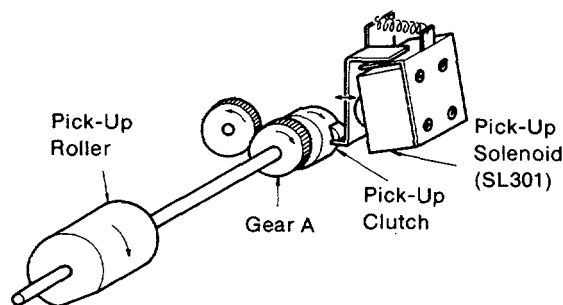


Figure 7-10. Feed Roller Assembly Operation

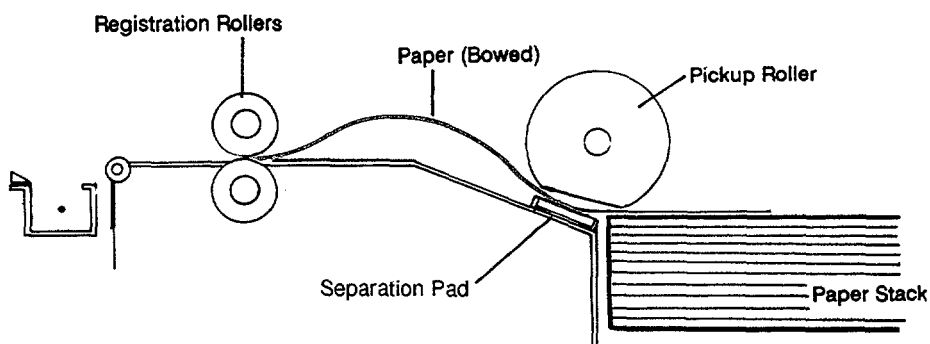


Figure 7-11. Paper Positioned in the Registration Rollers

Table 7-12. SL301 Checks

CHECKS	ACTION
1. Is anything hindering SL301's motion?	Visually inspect the solenoid.
2. Does the Paper Pickup Roller rotate?	Remove the paper tray cover. Observe the Paper Pickup Roller from the front of the Paper Tray while performing a Test Print. Note whether the Pickup Roller rotates. If the roller does not rotate, refer to the procedures following this table.
3. Are all the pins of the Paper Control PCA seated properly into the DC Controller PCA connector in the printer's base plate?	Visually inspect and correct as necessary.
4. Is SL301 operational?	Perform the following checks.

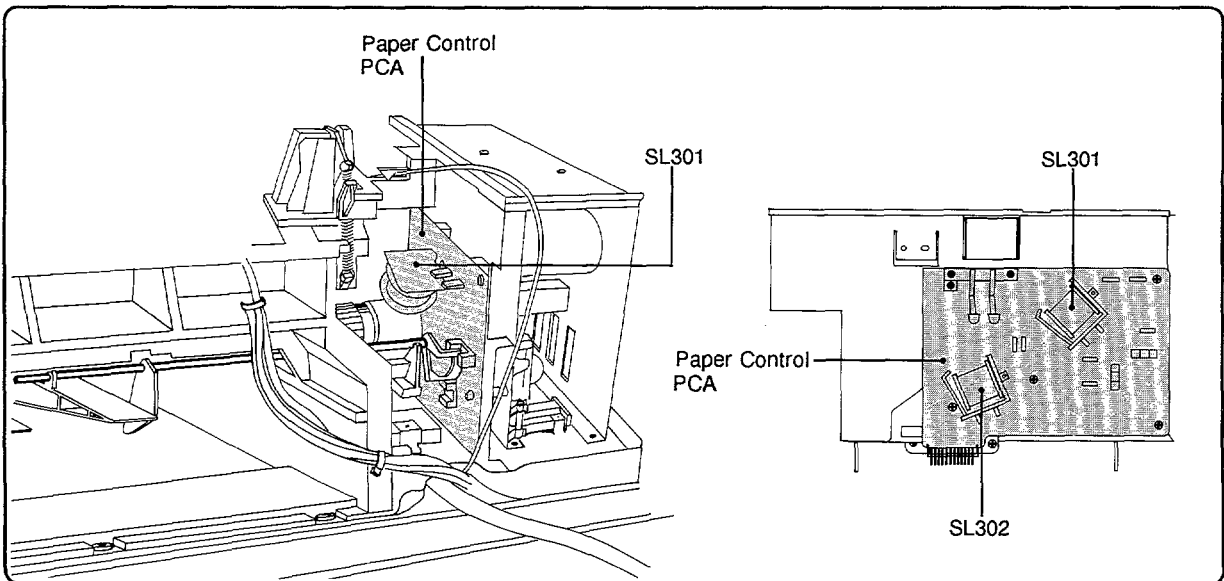


Figure 7-12. Paper Pickup Solenoid (SL301) Location

SL301 Functional Check

With the Main Body Cover Assembly (top cover panel only for the HP 33449) removed, observe the Pickup Roller while the printer is performing its Test Print function. Observe whether solenoid SL301 is being energized. If solenoid SL301 is energized, the Main Motor (M1) is operating, and the Pickup Roller *does not* turn one full revolution, replace the Feed Roller Assembly. If solenoid SL301 is not being energized, perform the following electrical check.

SL301 Electrical Check

Remove the Bottom Covers. Solenoid SL301 may be electrically checked, using frame ground as a reference, by monitoring J213-04 (CPUD) while performing a TEST PRINT. The voltage should switch from 0 Vdc to +5 Vdc (enabled). If the voltage changes but SL301 is NOT being energized, replace the Paper Control PCA (on which SL301 is mounted). If the voltage does not change, replace the DC Controller PCA. **Note:** Since this is a momentary signal, an oscilloscope may be required to view it.

Table 7-13. Paper Feed Mechanical Checks

CHECKS	ACTION
1. Does the paper have a slight bow (buckle) when it contacts the Registration Rollers? (See Figure 7-11.)	If the roller is picking paper, yet the paper is not entering the Registration Rollers, the Feed Roller Assembly is either worn or installed incorrectly. Replace the Feed Roller Assembly and Separation Pad. See the following "Feed Roller Assembly Functional Check" for verification.
2. Is the flat surface of the Paper Pickup Roller facing the Separation Pad?	If the flat portion of the roller does not face the pad when in the idle state, the roller is installed incorrectly or is defective. Replace the Feed Roller Assembly as described in Chapter 6.
3. Is more than one page being fed to the Registration Rollers?	Multiple pages being fed from the input tray is a result of the media having a poor cutting edge, a worn Separation Pad, or a damaged paper tray. Resolve as appropriate.

Feed Roller Assembly Functional Check

If the Feed Roller Assembly is excessively worn, paper will not be pulled completely to the Registration Rollers. To verify, measure the distance from where the trailing edge of the paper momentarily stops to the front of the paper tray (see Figure 7-13). The trailing edge of the paper should stop about 3.5 inches (95mm) from the front fence of the paper tray. If the paper has not advanced the specified distance, replace the Feed Roller Assembly and Separation Pad.

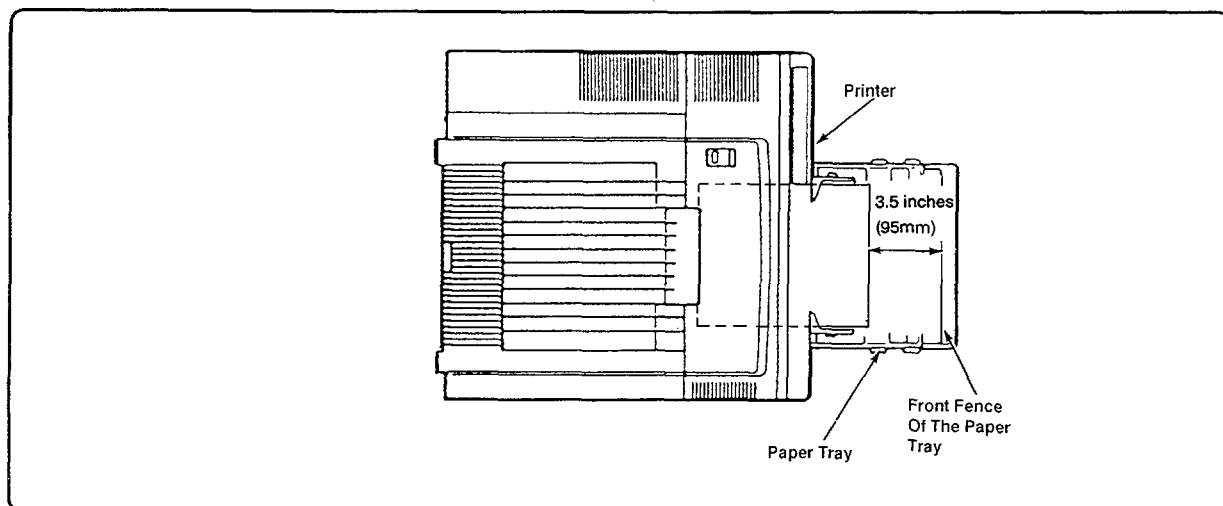


Figure 7-13. Feed Roller Wear

Registration/Transfer Area Checks

The Registration Assembly aligns the leading edge of the paper with the print image on the photoconductive drum. Drive to the Registration Rollers is provided by the Main Motor via the Registration Roller clutch (SL302). During normal operation, the Main Motor is continuously operational after receiving the print (PRNT) command. The Registration Rollers are not rotating since they are held in position by solenoid SL302's locking lever.

Following Main Motor startup, the Feed Roller Assembly first feeds paper to the Registration Rollers. When the image on the photosensitive drum and the leading edge of the paper (which is being held in the Registration Rollers) are aligned, the DC Controller enables the REGD (Registration Roller Clutch Drive) signal that energizes solenoid SL302. The energizing of this solenoid engages the Registration Roller clutch, thereby allowing the rollers to advance the paper so that the image may be properly transferred to the paper at the transfer station.

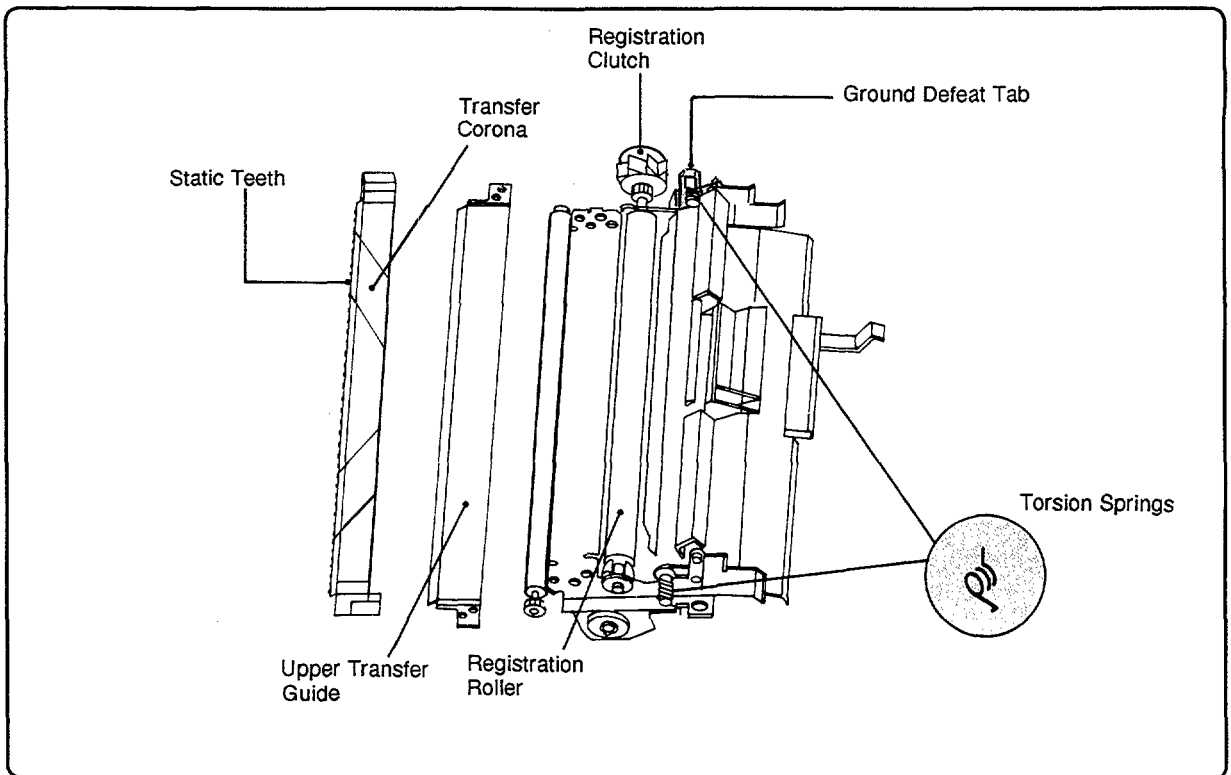


Figure 7-14. Registration Assembly

Table 7-14. Registration/Transfer Area Checks

CHECKS	ACTION
1. Are there any obstructions in the transfer area paper path?	Open the Top Cover Assembly of the printer and visually inspect the transfer area.
2. Are the Registration Roller torsion springs in place?	Visually inspect the springs. Correct if they are not in position. (See Figure 7-14).
3. Is the Upper Transfer Guide deformed?	Inspect the guide. Hint: a quick check would be to lift up on the registration locking lever and verify if several sheets of paper (i.e., 2 or 3) can easily be slid under the Transfer Guide.
4. Is the Transfer Corona monofilament line hindering the paper path?	Visually inspect the Transfer Corona Assembly and replace if necessary.
5. Are any of the drive gears excessively worn, dirty, or damaged?	Inspect the gears. Replace if necessary.
6. Is the Main Motor operational?	Perform the printer Self Test and visually observe if the motor is rotating. See the "Main Motor (M1) Functional Check" (Table 7-10).
7. Is anything preventing the energizing of solenoid SL302 on the Paper Control PCA?	See "SL302 Functional Check" following this table.
8. Are the Registration Assembly and clutch operational?	See the "Registration Assembly Functional Check" which follows.

SL302 Functional Check

With the printer ON, open the printer's Top Cover Assembly. Defeat the printer's Top Cover Assembly and EP-S Cartridge installed interlock switches (see Figure 7-17). While performing a TEST PRINT, observe solenoid SL302. If the solenoid is not being energized, perform the following electrical check.

SL302 Electrical Check

Remove the Bottom Cover(s). Using FRAME GND as a reference, measure J213-03 (REGD) on the DC Controller PCA while performing a TEST PRINT. The voltage level should switch from 0 Vdc (disabled state) to +5 Vdc (enabled). If the voltage does not switch, replace the DC Controller PCA. If the voltage switches, but the solenoid is not energizing, replace the Paper Control PCA.

Registration Assembly Functional Check

If (1) SL302 is operating properly, (2) the Main Motor is functional, and (3) paper (or other media) *is not moving smoothly* through the Registration Assembly, the clutch or rollers may be excessively worn. If this is suspected, replace the Registration Assembly.

Note



A worn Feed Roller Assembly may also "catch" paper as the Registration Assembly is trying to move the paper through the printer. This normally results in an intermittent (i.e., once every 50 to 100 pages) overprint "band" on the page.

Exit Area Checks

The exit area of the printer consists of the Fusing Assembly, Delivery Assembly, and Face-Up (Rear) and Face-Down (Top) Output Trays. Paper first enters the exit area of the printer at the Fusing Assembly. In the Fusing Assembly, the paper is guided between the fusing and pressure rollers where the toner image is permanently fused to the paper. As paper exits the Fusing Roller, the Paper Pickoff Pawls pick the paper off the Fusing Roller. A Paper Exit Arm Flag and an associated sensor (PS331) detect paper as it enters and exits the Fusing Assembly. The main microprocessor on the DC Controller uses this signal (\overline{PDP}) for monitoring paper jams.

The paper then encounters the Deflector Pawls (claws) which route the paper to the desired output tray. In the downward position, paper is guided to the Face-Down (Top) Output Tray. In the upward position, paper is guided to the Face-Up (Rear) Output Tray. Their position is controlled by the position of the Face-Up (Rear) Output Tray. The delivery rollers in the Top Cover Assembly feed the paper to the Face-Down (Top) Output Tray.

Drive for the Fusing Assembly is achieved when the printer Top Cover Assembly is closed. Closing the cover forces a molded protrusion in the rear portion of the Top Cover Assembly to push against a lever on the right end of the Fusing Assembly (see Figure 7-15). Pushing down this lever causes the main drive gears of the Fusing Assembly to engage with the drive gear train from the Main Motor. Drive to the Top Cover Assembly is provided by the Fusing Assembly when the Top Cover Assembly is closed via the Delivery Coupler Assembly (see Figure 7-15).

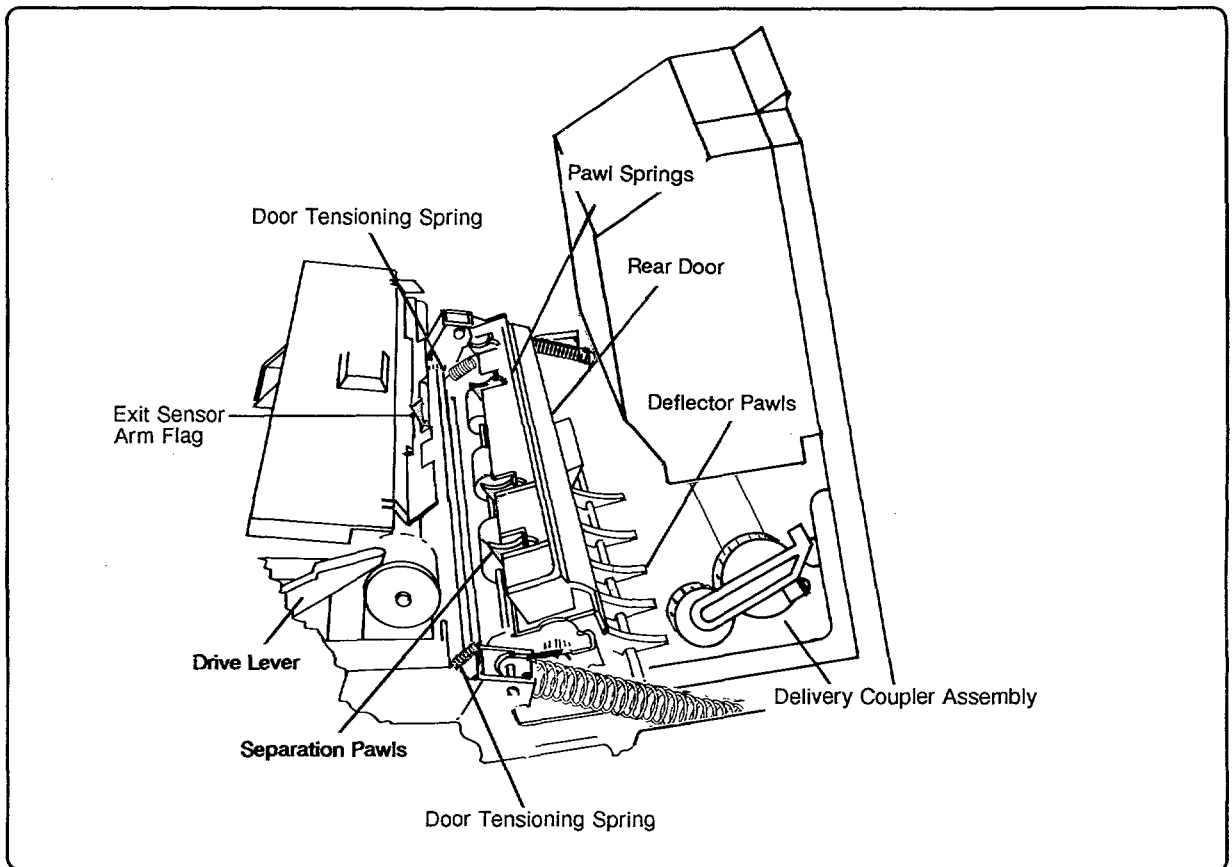


Figure 7-15. Paper Exit Area

Table 7-15. Exit Area Checks

CHECKS	ACTION
1. Are there any obstructions in the paper path?	Visually inspect. Open the top of the Fusing Assembly. Remove the cleaning pad and inspect the Fusing Roller. Open the rear door of the Fusing Assembly and inspect for obstructions.
2. Open the rear door of the Fusing Assembly. Are the Fuser Separation Pawls correctly attached to the rear fuser door with the tension springs?	Visually inspect and clean if necessary (refer to Figure 7-15).
3. Are the right and left fuser rear door tensioning springs in position?	Visually inspect, (refer to Figure 7-15). Replace if damaged or missing.
4. Are the Paper Exit Sensor Arm and photointerrupter damaged or broken? Is anything hindering the Paper Exit Sensor Arm's motion?	Visually inspect, (refer to Figure 7-15). Replace if damaged.
5. Does the Paper Exit Sensor indicate the presence of paper to the DC Controller PCA?	See the "Paper Exit Sensor (PS331) Functional Check" following this table.
6. Is the Deflector Pawl Assembly correctly positioned? (Refer to Figure 7-15).	Visually inspect. When paper is to be directed to the Face-Down (Top) Output Tray, the front of the deflectors point downward and rest against the moulded protrusions on the rear exit panel. When paper is directed to the Face-Up (Rear) Output Tray, the front of the pawls face forward. Verify that the pawls are correctly positioned under these conditions.
7. Is the Delivery Coupler Assembly correctly positioned? (Refer to Figure 7-15).	The gears should be pointing downward as shown in Figure 7-15. Is the gear tensioning spring riding on the metal frame of the hinge bracket? If the gears are out of position or the spring tab is bent or damaged, correct or replace. Note: Earlier Delivery Coupler Assemblies were manufactured with the spring riding on the top bracket surface. Newer assemblies are designed so that the spring rides on the rear bracket surface.
8. Is the Delivery Assembly damaged or excessively worn?	Replace as necessary.

Paper Exit Sensor (PS331) Functional Check

The Paper Exit Sensor PS331 is located on the Exit Sensor PCA (see Figure 7-16). This sensor and an associated Exit Sensor Arm detect paper motion as the paper enters and exits the Fusing Assembly. The main microprocessor on the DC Controller uses this exit flag signal (\overline{PDP}) for monitoring paper movement through the printer.

Table 7-16. Paper Exit Sensor (PS331) Check

CHECKS	ACTION
1. Is the Exit Sensor Arm or photointerrupter damaged or broken?	Visually inspect and replace as necessary.
2. Does the Exit Sensor indicate the presence of paper to the DC Controller PCA?	Perform the following Operational and Electrical checks.

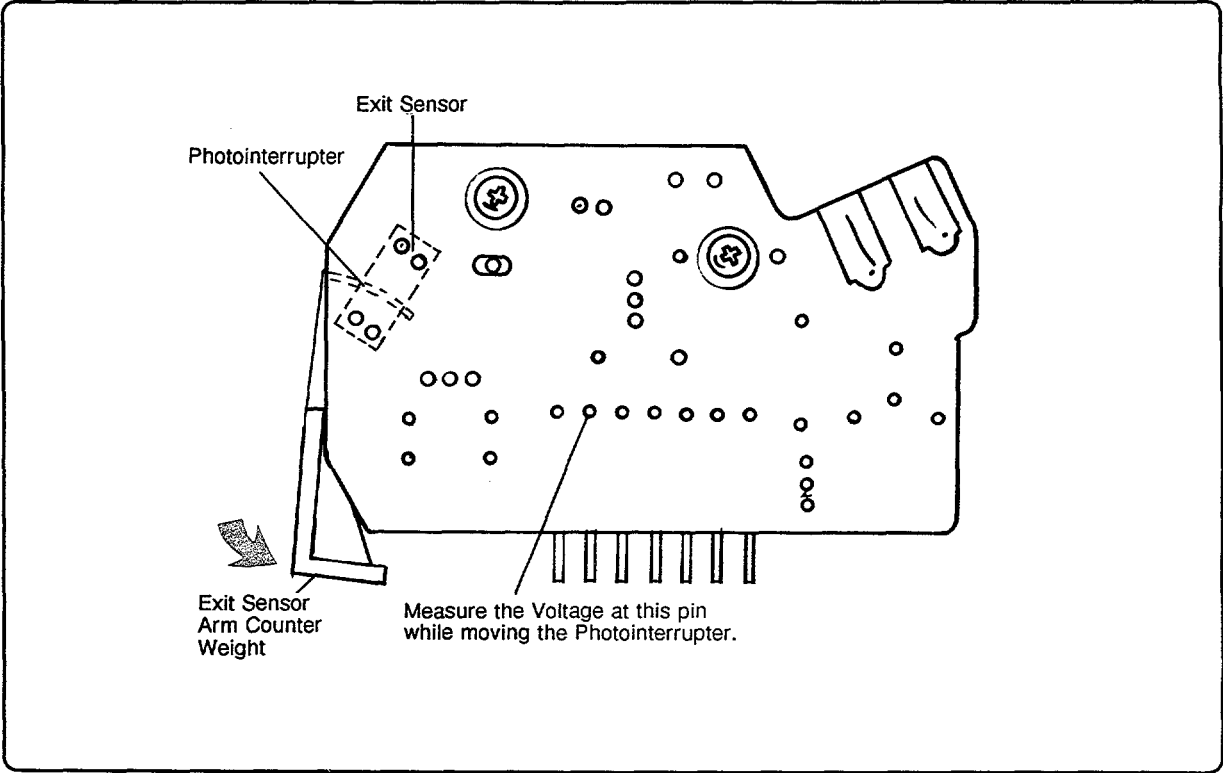


Figure 7-16. Paper Exit Sensor Check

Operational Check

This will simulate a paper jam:

1. Power off the printer.
2. Remove the printer's Main Body Covers (left cover only on the HP 33449).
3. Push and hold the bottom of the Exit Sensor Arm counterweight fully forward (toward the front of the printer) and power ON the printer.
4. If PS331 is functioning properly, the printer will display a 13 PAPER JAM error after completing its warmup cycle. Power the printer OFF and allow the sensor arm to rotate to its normal position.

The printer should now power up to the 00 READY state. If the sensor is not functioning in this manner, perform the electrical check.

Electrical Check

Use the following procedure to perform the electrical check:

1. Remove the Bottom Cover(s).
2. Using FRAME GND as a reference, measure the voltage at J206-6 (PDP) on the DC Controller PCA while moving the Exit Sensor Arm counterweight back and forth. The voltage should toggle from 0 Vdc to +5 Vdc.
3. If the voltage does not change states when the Exit Sensor Arm is moved, replace the Exit Sensor PCA. If the voltage changes but the printer continues to report "false" paper jams, replace the DC Controller PCA.

You may also measure the voltage on the Paper Exit Sensor PCA as shown in Figure 7-16 while moving the Exit Sensor Arm. The voltage should toggle from 0 Vdc to +5 Vdc as referenced to frame ground. If the voltage does not change states while the photointerrupter is moved, replace the Exit Sensor PCA. If the voltage does change but the problem persists, the cable between the Fusing Assembly and the DC Controller—or the DC Controller itself—may be at fault.

"14 NO EP CART" Message

The 14 NO EP CART installed message occurs when neither of the drum sensitivity switches (SW301 and SW302) on the Paper Control PCA is activated. When the EP-S Cartridge is installed and the Top Cover Assembly is closed, the EP-S Cartridge drum sensitivity tabs contact microswitches SW301 and SW302 on the Paper Control PCA (see Figure 7-17). The input from these switches is fed directly to the submicroprocessor on the DC Controller PCA. This microprocessor uses these signals to regulate laser power output.

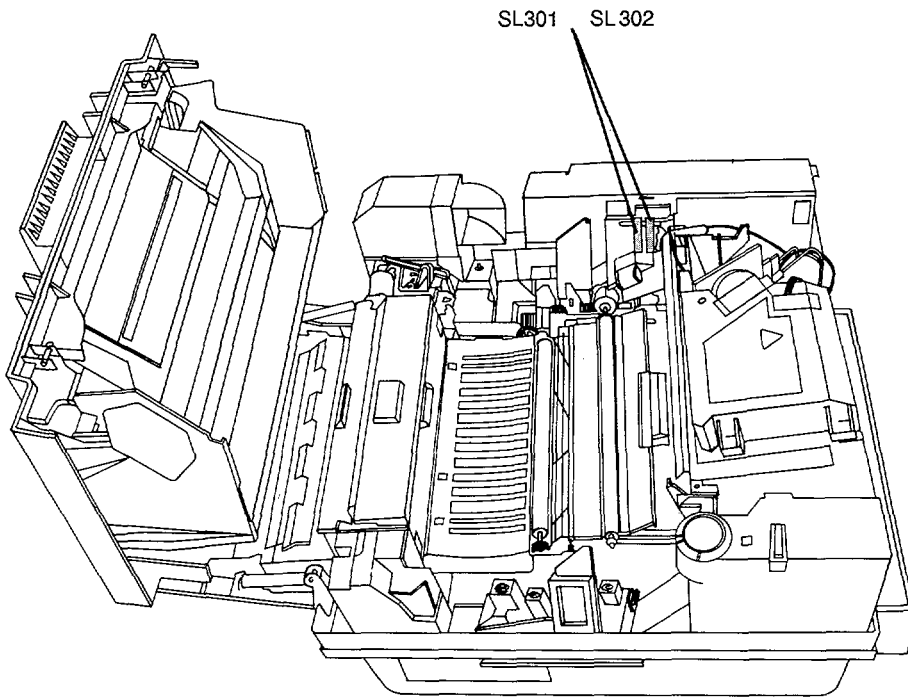


Figure 7-17. EP-S Cartridge Sensitivity Switches

Table 7-17. "14 NO EP CART" Checks

CHECKS	ACTION
1. Is an EP-S Cartridge installed in the printer?	Install cartridge if necessary.
2. Is there at least one sensitivity tab on the EP-S Cartridge?	Visually inspect. The EP-S Cartridge must have at least one sensitivity tab. If the cartridge has no tab, replace the EP-S Cartridge.
3. Is the Paper Control PCA firmly seated into its connector?	Visually inspect. Ensure that none of the pins are bent or damaged.
4. Is the Paper Control PCA defective?	See the "Drum Sensitivity Switches (SW301 and SW302) Functional Check" following this table.
5. Is DC Controller PCA defective?	See the "Drum Sensitivity Switches (SW301 and SW302) Functional Check" following this table.

Drum Sensitivity Switches (SW301 and SW302) Functional Check

The EP-S Cartridge Drum Sensitivity microswitches (SW301 and SW302) are located on the Paper Control PCA. If either microswitch is bad, the Paper Control PCA must be replaced.

Operational Check

1. Open the printer's Top Cover Assembly.
2. Defeat the Top Cover Assembly closed interlock switch in the DC Power Supply Assembly.
3. Press switch SW301 (refer to Figure 7-17). The display should change from 14 NO EP CART to 00 READY.
4. Release SW301 and the Top Cover Assembly interlock switch and repeat steps 2 and 3, testing SW302. Again, the display should change from 14 NO EP CART to 00 READY.

If this test fails, either the Paper Control PCA or DC Controller PCA is defective. Proceed with the following Electrical Check to determine the failing component.

Electrical Check

Verify that the EP-S Cartridge In-Place/Drum Sensitivity microswitches are functional as follows:

1. Remove the printer's bottom covers.
2. Using FRAME GND as a reference, measure J213 pin 1 ($\overline{\text{CSENS1}}$) and J213 pin 2 ($\overline{\text{CSENS2}}$), respectively, on the DC Controller PCA. The measured voltage level should change from +5 Vdc (switch open) to 0 Vdc (switch closed) as referenced to frame ground.
3. If the voltages DO NOT change while the switches are pressed, replace the Paper Control PCA. If the voltage levels change but the error message persists, replace the DC Controller PCA.

“16 TONER LOW” Message

A toner sensing mechanism is located in the toner cavity of the EP-S Cartridge. The function of this mechanism is similar to an antenna, sensing the AC developer bias voltages applied to the developer mixture by the High-Voltage Power Supply Assembly. The output sensed by this antenna is input back to the High-Voltage Power Supply (TSENS), where it is amplified and input to the DC Controller to be compared against a preset threshold value. If the toner level in the cartridge falls below the minimum level and, consequently, the monitored voltage level falls below the threshold level, the 16 TONER LOW message is displayed.

Table 7-18. “16 TONER LOW” Checks

CHECKS	ACTION
1. Is the EP-S Cartridge out of toner?	Shake the EP-S Cartridge. If the message persists, replace the cartridge.
2. Are the toner level sensor connectors damaged?	Inspect connectors for damage (see Figures 7-18 and 7-19). If damaged, correct or replace.
3. Is the EP-S Cartridge defective? (See Figure 7-19.)	Replace the EP-S Cartridge if visibly damaged.
4. Is the high-voltage connector cable, from the base of the printer (J601) to the DC Controller PCA, fully seated or damaged?	Visually inspect. Reseat or replace if necessary.
5. Is the High-Voltage Power Supply Assembly defective?	See the “Toner Low Functional Check” following this table.
6. Is the DC Controller PCA defective?	See the “Toner Low Functional Check” following this table.

Toner Low Functional Check

Since there is no good way to measure whether the toner low sensing system is malfunctioning (i.e., the warning message is constantly being displayed or is never displayed), replace the following components in the order listed:

1. EP-S Cartridge.
2. High-Voltage Power Supply Assembly.
3. High-Voltage Power Supply Cable (from the DC Controller).
4. DC Controller PCA.

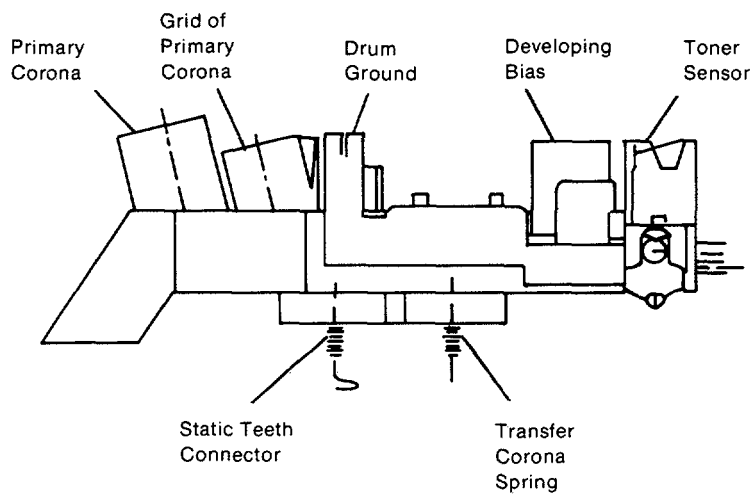


Figure 7-18. High-Voltage Power Supply Assembly Connector

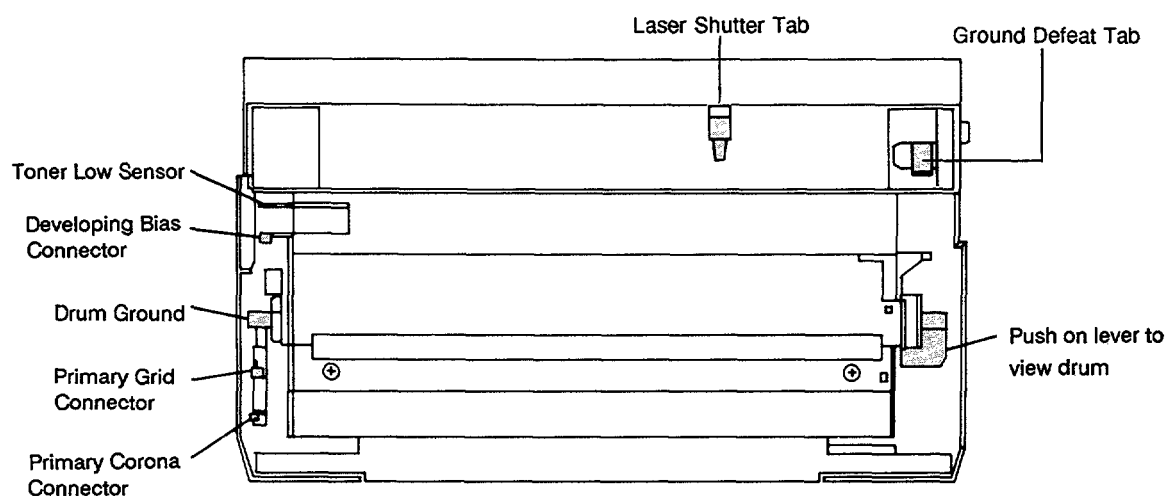


Figure 7-19. EP-S Cartridge (Bottom view)

“41 ERROR” Message

Two displays, 41 ERROR and 51 ERROR, indicate a laser beam detect problem. The 41 ERROR is displayed when the beam is “lost” for less than 2 seconds. An error condition of greater than 2 seconds will result in a 51 ERROR message. See the “51 ERROR Message” section for a discussion of the 41 ERROR message condition.

“50 SERVICE” Fuser Malfunction

The purpose of the fusing system is to maintain a constant temperature on the Fusing Roller so that the toner image is permanently fused to the paper. A high intensity fusing lamp, located in the center of the Fusing Roller, provides the high temperature required for the fusing process. While the printer is in standby mode, a temperature of 165° C is maintained on the Fusing Roller. While the printer is in printing mode, a temperature of 180° C is maintained.

The main components of the fusing system are the fusing lamp and its associated fusing and pressure rollers, a Thermistor, Thermoprotector, and the AC controller/safety circuitry in the AC Power Module. AC voltage is applied to the fuser bulb via the AC Power Module circuitry which is regulated by the FUSER DRIVE (FSRD) signal from the DC Controller PCA. Feedback to the DC Controller is provided by the Thermistor signal (FSRTH). The thermoprotection switch is designed for over temperature protection and opens when the temperature reaches 210° C. Overcurrent protection for the fusing system is provided by circuit breaker CB101 on the AC Power Module (see Figure 7-20).

For troubleshooting the printer when resting on its side, microswitch SW205 on the DC Controller PCA provides additional fusing system protection. When the bottom cover of the printer is removed, the microswitch closes and a resistor is placed in parallel to the Thermistor circuitry. This resistance simulates the Fusing Roller at temperature and this prevents the fusing lamp from operating under this condition.

The following conditions result in a fusing error:

1. A temperature below 140° C.
2. A temperature above 230° C.
3. A condition wherein a temperature of 165° C is NOT reached within 90 seconds after power-up.

If any of the fusing error conditions occur, the DC Controller posts a 50 SERVICE error. *The error cannot be cleared* until the printer has been powered down for a ten-minute interval.

Note

If the printer displays 50 SERVICE error, allow a ten-minute power down interval to elapse for the error to clear.



Table 7-19. "50 SERVICE" Fuser Malfunction Checks

CHECKS	ACTION
1. Is the Fusing Assembly correctly seated into its connectors on the AC Power Module and base plate (right and left ends)?	Visually inspect. Ensure the connectors are properly seated (no bent pins or pins outside their receptacles).
2. Is the +24A voltage present?	Verify per Figure 7-2.
3. Is the circuit breaker on the AC Power Module tripped?	Reset breaker.* (See Figure 7-20.) If the breaker trips again, replace the Fusing Assembly or the AC Power Module.
4. Is the Thermistor defective?	Perform the Thermistor Functional Check which follows.
5. Is the Fuser Bulb open?	Perform the Thermoprotector/Fuser Bulb Functional Check which follows.
6. Is the Thermoprotector open?	Perform the Thermoprotector/Fuser Bulb Functional Check which follows.
7. Are the cable assemblies defective?	If the fault is intermittent, replace the Fusing Assembly Cable to the DC Controller.* If the fault persists, replace the AC Power Module cable to the DC Controller.
8. Is the AC Power Module defective?	Replace the AC Power Module.*
9. Is the DC Controller PCA defective?	Replace the DC Controller PCA.*
*Be sure to wait at least ten minutes after the last occurrence of 50 ERROR to verify a fix.	

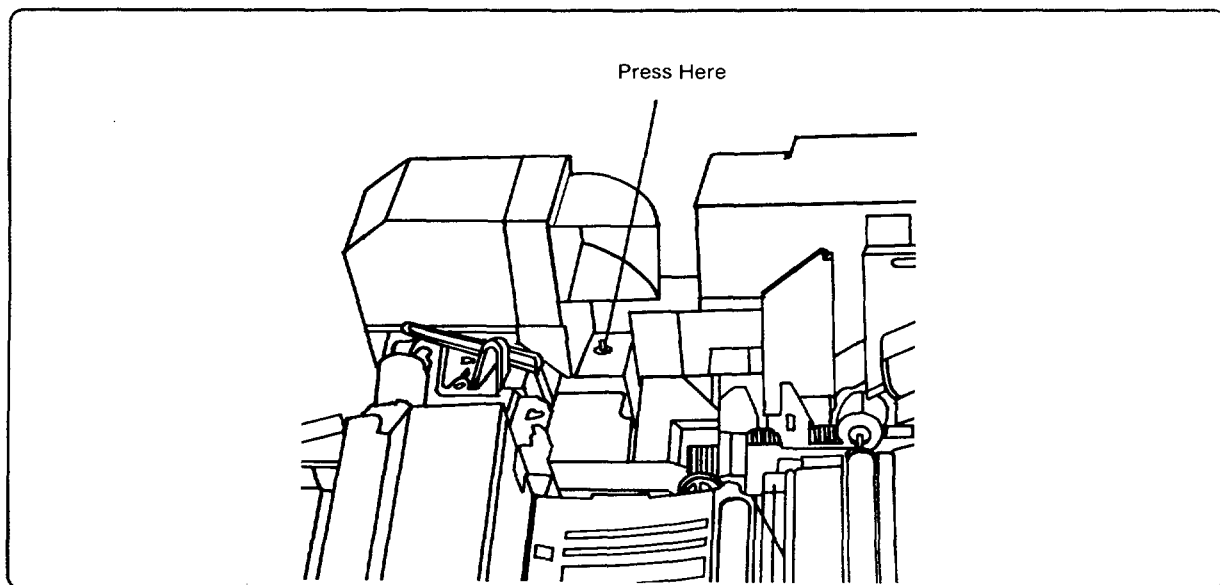


Figure 7-20. Fuser Circuit Breaker Reset

Thermistor Functional Check

Under normal operating conditions, Thermistor resistance decreases as its operating temperature increases. Because of this characteristic, it is difficult to measure an accurate resistance value for the Thermistor. However, some conclusions may be made concerning the condition of the printer Thermistor with a resistance check. Measure the Thermistor value using the following Electrical Check.

1. Power off the printer.
2. Remove the protective cover from the left side of the Fusing Assembly to access the Exit Sensor PCA.
3. Measure the Thermistor's resistance at J332, pins 1 and 2 (see Figure 7-21). At ambient room temperature (72° F, 23° C), the resistance should be approximately 1,130 kohms. If the printer has been operating for some time, the resistance value will be much lower. If the Thermistor appears to be either open or shorted, replace the Thermistor/Exit Sensor PCA.

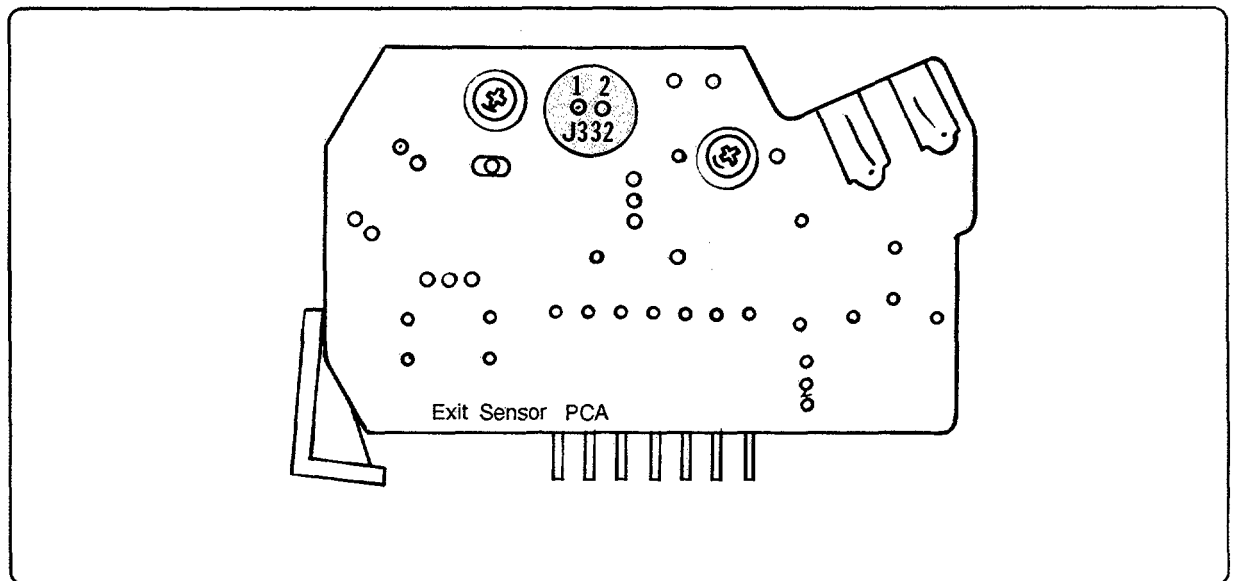


Figure 7-21. Thermistor Resistance at J332

Thermoprotector/Fuser Bulb Functional Check

Electrical Check

The Fuser Bulb and the Thermoprotector are wired in series. To quickly check these components, perform the following electrical check procedure:

1. Remove the Fusing Assembly.
2. Using an ohm meter, check for continuity at the two pin connector (J103) at the right side of the Fusing Assembly (see Figure 7-22).
3. If an open condition is detected, either the Fuser Bulb or the Thermoprotector is open. To differentiate between an open Fuser Bulb and an open Thermoprotector, proceed as follows:
 - a. Remove the screw securing the left side of the Fuser Bulb connector to the Thermoprotector connector.
 - b. Verify the continuity of the bulb from its connector wire to the rear connector of the two pin connector.

If the bulb is open, replace the complete Fusing Assembly. If the bulb appears good, but the serial continuity measurement indicates an open condition, replace the Thermoprotector.

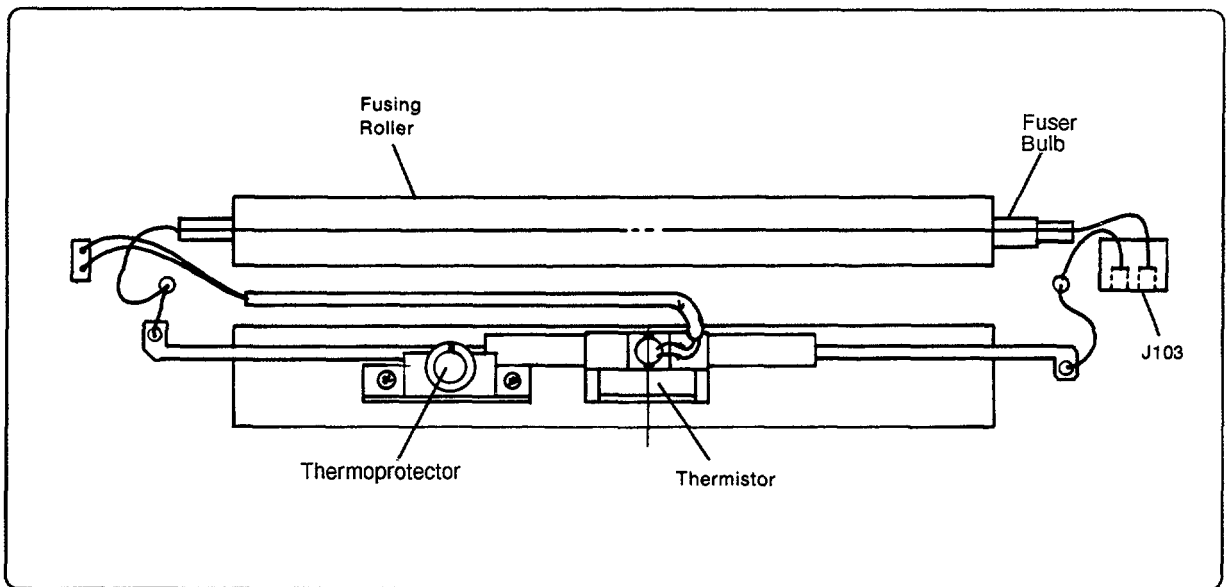


Figure 7-22. Thermoprotector/Fuser Bulb Check

“51 ERROR” Message

Two displays, 41 ERROR and 51 ERROR, indicate a laser beam detect problem. The 41 ERROR is displayed when the beam is “lost” for less than 2 seconds. An error condition of greater than 2 seconds will result in a 51 ERROR message.

A 41 ERROR (temporary Beam Detect Error) may occur during laser scanning operation. This error results when the beam detect signal falls outside the timing window established by the DC Controller PCA. If this situation occurs longer than an interval of two seconds, a 51 ERROR beam detect malfunction will occur.

The BEAM DETECT (\overline{BD}) signal is the horizontal synchronization signal indicating the beginning of a scan line. Once beam detect synchronization is achieved, video data may be transferred from the Interface/Formatter PCA to the DC Controller PCA to turn the laser diode on and off, thereby writing print data (in the form of dots) on the photosensitive drum.

At the beginning of printer operation, the DC Controller enables the Laser/Scanning Assembly and sets up a timing window. The DC Controller expects to receive a beam detect signal during this window. Once received, all data transfer is synchronized from the last beam detect signal.

A “Beam Detect Malfunction” indicates that the laser beam is not being detected. Beam detection occurs during the scanning process as the laser light strikes the beam detect mirror. The mirror reflects this light to a fiber optic cable that carries it to a sensing diode on the DC Controller PCA.

To prevent possible exposure to laser light, a safety interlock shutter has been incorporated into the design of the Laser/Scanning Assembly. The Laser Shutter Arm is located on a pivoting shaft below the Laser/Scanning Assembly. When the Top Cover Assembly of the printer is open or the EP-S Cartridge is missing, a blocking shutter within the Laser/Scanning Assembly blocks the path of laser light. A small tab on the edge of the EP-S Cartridge must contact the pivoting shutter lever before laser light is allowed to exit the laser cavity.

Warning



Although the infrared laser beam is invisible, eye damage can occur if direct or indirect (reflected) eye contact with the laser beam should occur. Heed all **CAUTIONS** and **WARNINGS** when working with the laser unit. Be careful when the fiber optic beam detect cable is detached since the laser light transmitted through the cable can also cause eye damage.

Table 7-20. "41 ERROR" Checks

CHECKS	ACTION
1. Is the printer's Feed Guide Assembly clean?	Thoroughly clean the Feed Guide Assembly.
2. Is the EP-S Cartridge defective?	Replace the EP-S Cartridge and retest the printer.
3. Is the Transfer Corona clean?	Physically remove the Transfer Corona Assembly and clean thoroughly or replace if necessary. Clean the base of the printer below the Transfer Corona.
4. Is the Transfer Corona Roller grounding block positioned properly so as to provide a ground path to the roller?	Verify proper installation as in Figure 6-30 in Chapter 6.
5. Does the Registration Assembly float with respect to ground when the Top Cover Assembly is closed?	Verify that the ground defeat tab on the EP-S Cartridge (Figure 7-19) is not damaged. With the ground defeat lever on the right side of the Registration Assembly (Figure 7-14) pushed down, resistance between the Registration Assembly and ground should be 15 Mohm ($\pm 5\%$). If the resistance is less than 15 Mohm, ensure the Registration Assembly is properly installed and clean as necessary to resolve the problem.
6. Are the two 15 Mohm resistors and/or the 1 kohm resistor under the Registration Assembly open?	Perform a resistance check. Note that in order to measure the 15 Mohm resistors with a standard $4\frac{1}{2}$ digit DVM on the "kohm" scale, the two resistors may have to be measured in parallel at 7,500 kohm $\pm 5\%$.
7. Is jumper J209 installed on the DC Controller PCA?	Verify and install if necessary.
8. Is static electricity a problem?	Verify humidity to be at least 20% RH.
9. Does the error persist?	Refer to the "51 ERROR Beam Detect Checks" table which follows (Table 7-21).

Table 7-21. "51 ERROR" Beam Detect Checks

CHECKS	ACTION
1. If intermittent, have checks 1-8 in Table 7-20 ("41 ERROR Checks") been performed?	Perform verification procedures.
2. Is -5 Vdc present?	Verify per Figure 7-2. If missing, replace the DC Power Supply. If -5 V is still absent, replace the DC Controller PCA.
3. Is the laser shutter protrusion tab on the EP-S Cartridge broken or damaged?	Visually inspect (see Figure 7-19). Replace the EP-S Cartridge if necessary.
4. Is the laser shutter interlock mechanism damaged?	Carefully inspect the Laser Shutter Arm mechanism. If necessary, remove the Laser/Scanning Assembly and inspect the pivot lever. Replace the mechanism if damaged.
5. Is the Fiber Optic Cable between the Laser/Scanning assembly and J201 of the DC Controller PCA correctly seated into each respective assembly?	Visually inspect the cable for damage and ensure that it is seated properly. Is the cable damaged? If necessary, remove the Fiber Optic Cable and shine a light through the cable to verify light continuity. Replace the cable if damaged. Warning: Do not use the laser light to perform this test.
6. Are connectors J202 on the DC Controller and J451 on the Laser Drive PCA properly seated?	Inspect connectors and wiring. Reseat or replace cables if necessary.
7. Is +5 Vdc present at J451-1 of the Laser Drive PCA?	Verify voltage with voltmeter. If voltage is not present, replace cable to DC Controller.
8. Is the Laser Unit defective?	Verify the laser power level per the following instructions. If the laser power is acceptable, replace the DC controller PCA.
9. Is the Laser/Scanning Cable Assembly damaged?	Closely inspect cable assembly. Examine for damaged wire crimps at the connector ends of the assembly. Replace harness assembly if damage is suspected.

Laser Power Verification

Required Tools

The following special tools are required for this verification procedure:

- Laser Power Checker # TKN-0198-000CN
- Digital Voltmeter (+/- 200mV DC Range)

Laser Power Output Check

The laser power circuitry is not adjustable. However, if it becomes necessary to verify the laser output, use the following procedures.

Warning



DO NOT place anything in the Laser/Scanning Assembly access hole other than the Laser Checker Tool. Although the laser beam is invisible, the reflected beam could possibly damage the eye.

1. Switch the printer power to OFF and open the Top Cover Assembly.
2. Remove the printer's Main Body Cover Assembly (on HP 33449, the top cover panel).
3. Heed the Laser Safety Label attached to the top of the Laser/Scanning Assembly to avoid possible injury.
4. Keep the Control Panel connector attached to the printer so the display can be read.
5. Open the plate covering the access hole for the laser power checker tool on the Laser/Scanning Assembly. Install the laser power checker tool into the opening (see Figure 7-23).
6. Connect the laser power tool leads to a digital multimeter and set the range to 200 mV DC.
7. Defeat the top-cover-in-place microswitch. Press down *both* EP-S Cartridge Drum Sensitivity Microswitches (SW301 and SW302).
8. Switch the printer's power ON.

Note



When the laser tool is installed in the printer, only one page of the Self Test will run before a 51 ERROR (Beam Detect Malfunction) appears on the printer's display panel. The laser power checker tool must have been calibrated within the last year to be effective.

9. With the laser tool installed (see Figure 7-23), the interlock switches defeated, and the voltmeter connected, perform a self test and verify the laser output.

The measured output should be 17.6 (\pm 1.6) millivolts. If this laser power cannot be measured, replace the following assemblies in the order listed:

1. Laser/Scanning Assembly.
2. Laser/Scanning Cable Assembly to the DC Controller.
3. DC Controller PCA.

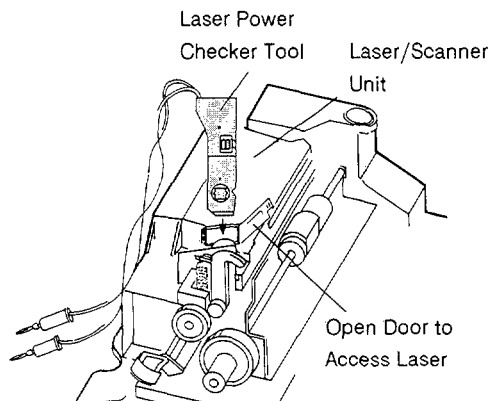


Figure 7-23. Installing Laser Power Checker Tool

“52 ERROR” Scanner Malfunction

The scanner motor is a flat, brushless, +24 Vdc motor. Motor operation is completely controlled by the DC Controller main microprocessor and motor speed is controlled by the SCANNER CONTROL (SCNCONT) signal. Motor speed is monitored via the FG– and FG+ feedback signals. LED 201 on the DC Controller PCA is illuminated when the scanner motor is at its operational speed.

The scanner motor is enabled briefly when the printer is powered-up (during the printer’s power-on Self Test) or whenever the PRINT ($\overline{\text{PRNT}}$) command is received by the Interface/Formatter PCA. The motor makes a distinctive sound, identified as a “variable pitch whirring noise,” when starting up. (The Main Motor noise is much more subtle and does not perceptibly vary in pitch.)

Table 7-22. Scanner Malfunction Checks

CHECKS	ACTION
1. Are the scanner motor connectors—J401 on the Scanner Motor PCA and J203 on the DC Controller PCA—firmly seated in their connectors?	Visually inspect. Ensure that connectors are properly seated. If the cable is damaged, replace the cable.
2. Is the J209 jumper in place on the DC Controller PCA?	Verify.
3. Is the problem intermittent?	Replace the cable assembly to the DC Controller.
4. Does the scanner motor run at all times after power-on, but before printing?	Replace the cable assembly to the DC Controller.
5. Is +24 Vdc present on J401-5 of the scanner motor PCA?	Measure the voltage. If voltage is not present, replace the cable to the DC Controller PCA.
6. Is the scanner motor defective?	See the “Scanner Motor Functional Check” following this table.
7. Is the DC Controller defective?	See the “Scanner Motor Functional Check” following this table.

Scanner Motor Functional Check

While performing Test Print, *listen* for the distinct noise of the scanner motor starting up. If this noise can not be detected, replace the following assemblies in the order listed:

1. Laser/Scanning Assembly.
2. Laser/Scanning Cable Assembly to the DC Controller.
3. DC Controller PCA.

7-5. IMAGE FORMATION TROUBLESHOOTING

Introduction

The quality of the printer's output is always subject to the judgment of the particular user. This section of the manual is intended to assist the service representative in defining print quality and understanding what factors may affect print quality.

The print samples depicted in Figure 7-24 illustrate some print quality defects and their possible causes. It is impossible to illustrate all possible print quality defects since there are too many variables in the printing process. It is recommended that the service representative keep copies of print quality defects with an explanation of their causes for future reference.

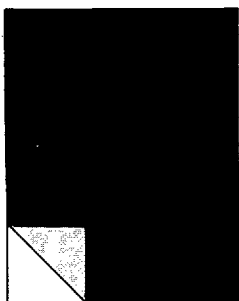
Image defects in the list below are covered in the tables which follow:

- Black Pages.
- Very Faint Print.
- Speckled Print.
- Vertical White Streaks.
- Right-Hand Text Missing or Distorted
- Faulty Registration.
- Random Horizontal Black Lines.
- Slightly Faint Print.
- Suede Print.
- Smeared Print/Improper Fusing.
- Distorted Print.
- Repetitive Defects.
- Black Pages with Horizontal White Strips.
- Image Skew.
- Improperly Sized Image.
- Vertical Dark Streaks.
- Character Voids.
- Background.
- Smudged Horizontal Band with Overprint.
- Black Stripe on Right Side of Page.
- White or Blank Pages.

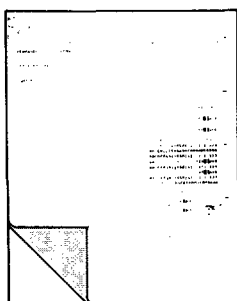
Note

"Horizontal" and "vertical" refer to paper movement and not to the orientation of print on the page.

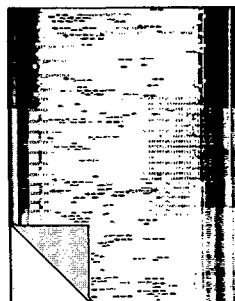




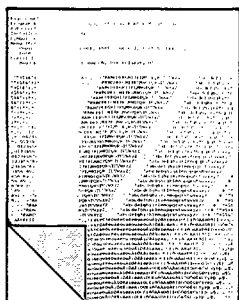
Black Pages



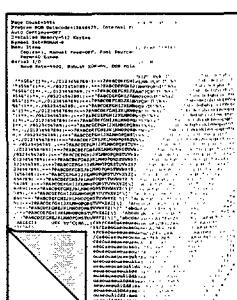
Very Faint Print



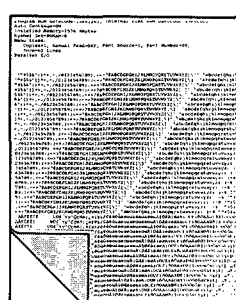
Speckled Print



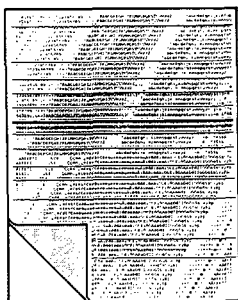
Vertical White Streaks



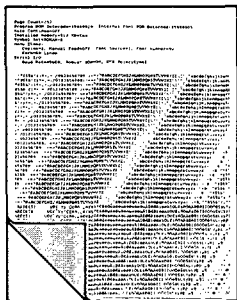
Right-Hand Text
Missing/Distorted



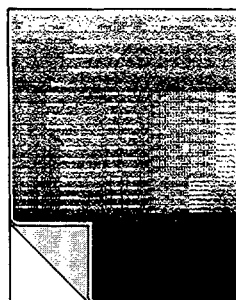
Faulty Registration



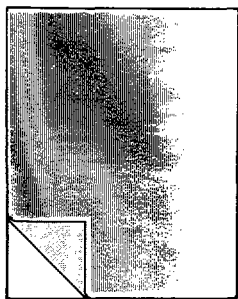
Random Horizontal
Black Lines



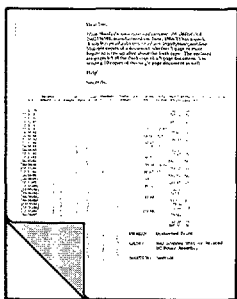
Slightly Faint Print



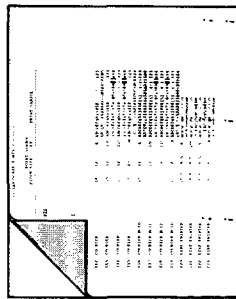
Suede Print



Smeared Print/
Improper Fusing



Distorted Print



Repetitive Defects

Figure 7-24. Image Defect Summary



Black Pages with
Horizontal White Strips

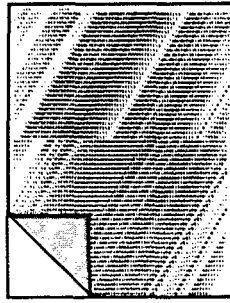
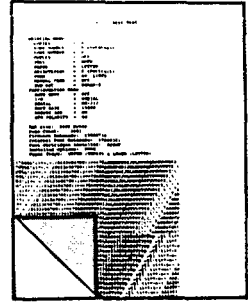
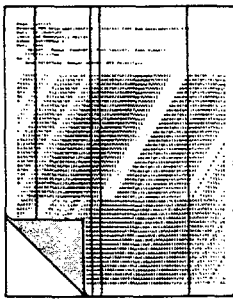


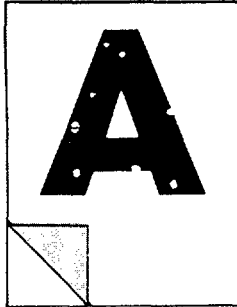
Image Skew



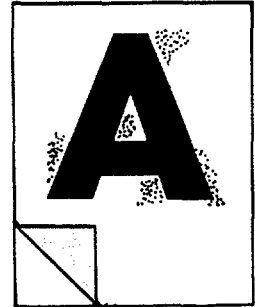
Improperly Sized Image



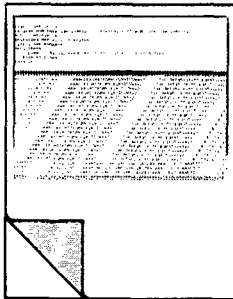
Vertical Dark Streaks



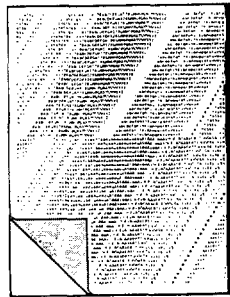
Character Voids



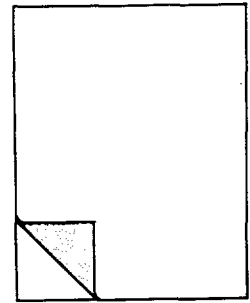
Background



Smudged Horizontal Band
with Overprint



Black Stripe on
Right Side of Page



White or
Blank Pages

Figure 7-25. Image Defect Summary (Continued)

Table 7-23. Black Pages

POSSIBLE CAUSE	WHY	ACTION
1. No Primary Corona. (Blotchy with undefined border.)	The Primary Corona applies a negative charge to the drum's surface which repels the less-negatively-charged toner, except in those areas exposed to the laser light. Without the Primary Corona's charge, because of the erase lamps the drum's surface would be neutral, attracting the less-negatively-charged toner and, therefore, creating a totally black image.	Replace the EP-S Cartridge. If the problem persists, refer to Table 7-45, "High-Voltage Systems Checks."
2. Laser/Scanning Cable Assembly. (Defined border)	Low-level signals exchanged between the Laser/Scanning Assembly and the DC Controller may be affecting laser output.	Replace the Laser/Scanning Cable Assembly.
3. Laser/Scanning Assembly. (Defined border)	Circuitry in the assembly is causing the laser to run out of control.	Replace the Laser/Scanning Assembly.
4. DC Controller PCA. (Defined border)	If the laser drive circuitry is damaged so that the laser is always on, the surface of the drum would be constantly discharged by the laser.	Replace the DC Controller PCA followed by the I/F PCA as required. Hint: Disconnect the I/F PCA from the DC Controller and perform a Test Print to determine the source.

Table 7-24. Very Faint Print

POSSIBLE CAUSE	WHY	ACTION
1. Empty EP-S Cartridge.	No toner is available for print.	Replace the EP-S Cartridge.
2. Weak or no Transfer Corona current.	The Transfer Corona's purpose is to apply a positive charge to the back of the paper to attract the negatively charged toner image from the drum to the paper.	Perform the "Image Development (Half Self Test) Functional Check" following these tables and proceed as directed.
3. Weak or no developer bias.	If no developer bias is available, toner is not attracted to the drum's discharged areas.	Refer to Table 7-45, "High-Voltage System Checks."
4. Paper.	The paper moisture content, conductivity, finish, etc., may not be acceptable for use in the electrophotographic process.	Try a known type and source of paper. Refer to the <i>Paper Specifications Guide</i> or Chapter 2, Section 2-4.
5. Drum ground path interrupted.	A dirty or damaged drum ground contact will not allow electrical discharge or laser-exposed areas.	Clean or repair the drum ground contacts.

Table 7-25. Speckled Print

POSSIBLE CAUSE	WHY	ACTION
1. No Primary Corona Grid.	The purpose of the Primary Corona Grid is to ensure that the Primary Corona deposits a uniform negative charge to the surface of the drum. If the grid is not functioning properly, uneven charges are deposited on the drum's surface. The random areas of uneven charges appear as dark blotches in the print.	Replace the EP-S Cartridge. If the problem persists, refer to Table 7-45, "High-Voltage System Checks."

Table 7-26. Vertical White Streaks

POSSIBLE CAUSE	WHY	ACTION
1. Dirty Beam-to-Drum Mirror.	The Beam-to-Drum Mirror reflects the laser light from the scanner to the surface of the photoconductive drum. If the mirror is dirty, the laser light is blocked and the image is not written properly on the drum.	Carefully clean the Beam-to-Drum Mirror. A quality camera lens cleaning fluid and tissue can be used if necessary. The mirror may be easily accessed by moving the mirror shutter to the right and folding it up out of the way.
2. Dirty Transfer Corona.	The purpose of the Transfer Corona is to apply a positive charge to the back of the paper to attract the negatively charged toner image from the drum to the paper. If portions of the Transfer Corona are extremely contaminated or blocked, vertical streaks would occur in the printed output.	Clean the Transfer Corona housing and wire per instructions in Chapter 4, Section 4-4.
3. EP-S Cartridge.	No toner is available for print.	Replace the EP-S Cartridge.
4. Laser/Scanning Assembly.	The focusing lenses within the Laser/Scanning Assembly may be contaminated, blocking (or diffusing) the laser light.	Replace the Laser/Scanning Assembly.

Table 7-27. Right-Hand Text Missing/Distorted

POSSIBLE CAUSE	WHY	ACTION
1. EP-S Cartridge.	No toner available for print.	Replace the EP-S Cartridge.
2. Beam-to-Drum Mirror incorrectly installed.	The Beam-to-Drum Mirror reflects the laser light from the scanner's polygonal mirror to the surface of the photoconductive drum. If the mirror is installed incorrectly (end-for-end) or is not fully resting on the mirror supports, the scan plane of the laser will not be parallel. The resulting image written on the drum will be distorted, missing, or out of parallel alignment.	Verify that the mirror is resting firmly on the moulded plastic supports. Note that the mirror is spring loaded and should rest squarely on the supports. If the mirror had been removed during maintenance, ensure that the mirror has been correctly reinstalled. Refer to Chapter 6 for proper mirror installation.
3. Bent Top Cover Assembly Hinge Brackets.	If the Top Cover Assembly Hinge Brackets are bent, the Beam-to-Drum Mirror will not reflect the laser beam to the drum properly.	Replace the Top Cover Assembly Hinge Brackets.

Table 7-28. Faulty Registration

POSSIBLE CAUSE	WHY	ACTION
1. Worn Feed Roller Assembly.	If the Paper Pickup Roller or associated clutch is sufficiently worn, the leading edge of the paper may not reach the Registration Rollers in time.	Replace the Feed Roller Assembly.
2. Registration Assembly.	The Paper Pickup Roller positions the leading edge of the paper at the Registration Rollers. If these rollers do not grab the paper at the proper time and move it smoothly through the printer (due to worn rollers, springs, or clutch), misregistration will occur.	Replace the Registration Assembly.
3. Drive Gears.	If any gear within the gear drive train becomes excessively worn or is excessively dirty, erratic paper movement would result, leading to image misregistration.	Closely examine the gears along the paper path for wear and contamination. Clean and inspect the gears. Replace any defective gear.
4. Paper Tray.	The paper tray may be preventing the paper from freely moving through the printer.	Replace the paper tray.
5. Paper.	The surface of the paper may be too smooth for the pickup roller to move the paper through the paper path.	Change paper. Refer to the <i>Paper Specifications Guide</i> or Chapter 2, Section 2-4 ("Paper Specifications").

Table 7-29. Random Horizontal Black Lines

POSSIBLE CAUSE	WHY	ACTION
1. Defective or improperly seated Fiber Optic Cable.	Horizontal black lines could occur in the event of a beam detect error (41 ERROR). In this condition (i.e., the microprocessor is expecting beam detect, but never receives it), the processor turns on the laser continuously, searching for beam detect. If beam detect has not occurred after two seconds, a 51 ERROR message is displayed on the Control Panel. If the Fiber Optic Cable is damaged or disconnected, the beam would be blocked from the microprocessor and an error would result.	Replace the Fiber Optic Cable.
2. Laser/Scanning Assembly.	If the beam detect mirror within the assembly becomes misaligned or damaged, beam detect would not consistently be provided to the DC Controller PCA.	Replace the Laser/Scanning Assembly.
3. DC Controller PCA.	See previous explanations.	Replace the DC Controller PCA.

Table 7-30. Slightly Faint Print

POSSIBLE CAUSE	WHY	ACTION
1. EP-S Cartridge.	No toner available for print.	Replace the EP-S Cartridge.
2. Print Density set improperly.	The higher the Print Density Dial setting, the smaller the amount of toner that will be transferred to the EP drum.	Turn the Print Density Dial to a lower setting (i.e., toward "1"). Replace the HVPS if no effect.
3. Drum Sensitivity Switches.	The drum sensitivity switches sense the drum's sensitivity to three levels of laser light. Malfunctioning microswitches may cause the microprocessor to adjusting the laser power level incorrectly with respect to EP-S Cartridge requirements.	Perform the "Drum Sensitivity Switches (SW301 and SW302) Functional Check" in Section 7-4.
4. Erase Lamp Assembly.	Slightly faint print may result over time if the erase lamps are malfunctioning.	Perform the "Erase Lamp Functional Check" following.
5. Low laser power.	Low laser power would result in an inadequately discharged surface on the photoconductive drum.	Verify the laser power output. Refer to "Laser Power Verification" in Section 7-4.
6. Paper.	The paper may not be acceptable to the electrophotographic processes.	Try a known source and type of paper. Refer to the <i>Paper Specifications Guide</i> or to Chapter 2, Section 2-4.
7. Transfer Corona.	Corona functionality may not be at peak.	Clean the Corona Assembly.

Table 7-31. Suede Print

POSSIBLE CAUSE	WHY	ACTION
1. DC Controller PCA.	If the laser drive circuitry is malfunctioning and turning the laser on and off at incorrect intervals, suede print may be observed.	Perform a Test Print to isolate the DC Controller from the Interface/Formatter PCA. If the defective print occurs during the Test Print function, assume a defective DC Controller PCA and replace it.
2. Interface/Formatter PCA.	If the Interface/Formatter PCA is defective, the PCA may be instructing the DC Controller PCA to turn the laser on and off at incorrect times.	Perform a Test Print to isolate the DC Controller PCA from the Interface/Formatter PCA. If the test print is acceptable but the Control Panel test operation is unacceptable, replace the Interface/Formatter PCA.

Table 7-32. Smeared Print/Improper Fusing

POSSIBLE CAUSE	WHY	ACTION
1. Fusing Assembly.	The print will be smeared if the Fusing Assembly is not heated sufficiently to bond the toner image to the paper.	Perform the "Fusing Check" at the end of this section.
2. Bent Static Teeth.	The purpose of the static teeth is to assist in separating the paper from the photoconductive drum by discharging the positive charges placed on the paper by the Transfer Corona. If the static teeth are defective, the print could possibly become smeared prior to the paper entering the Fusing Assembly.	Closely examine the static teeth for defects. If the teeth are bent or defective, replace the Transfer Corona Assembly.
3. Media.	The media may not be acceptable for the EP process and for laser printing.	Verify that the media meets specifications. (See the <i>Paper Specifications Guide</i> or Chapter 2, Sections 2-4–2-6.
4. Dirty Fuser Cleaning Pads.	Excessively dirty fuser cleaning pads may result in contamination of the Fusing Roller, thereby causing smeared print.	Replace the Fuser Cleaning Pad.
5. Worn Gears.	When the EP-S Drum and paper are not moving at the same speed, smudged characters (often appearing to be bold characters) will result.	Replace the EP-S Cartridge, Feed Drive Assembly, 19- and 57-Tooth Gears, Main Motor, or Fusing Assembly as necessary.
6. Foreign object in paper path.	Something is smearing the unfused toner image on the surface of the paper.	Remove any foreign material. Try a new EP-S Cartridge.

Table 7-33. Distorted Print

POSSIBLE CAUSE	WHY	ACTION
1. Paper Path.	If any component within the paper path is preventing the paper from moving at a uniform rate, the print image would be affected (e.g., the main motor rotating too fast or too slow, the transport gears excessively worn, etc.). Characters that are either too tall or too short (in the direction of paper motion) are usually a result of drive mechanism problem.	Closely examine the paper transport rollers along the paper path for wear. Replace if excessive wear is observed. Inspect and replace the EP-S Cartridge, Feed Drive Assembly, 19- and 57-Tooth Gears, Main Motor and Drive Assembly, or Fusing Assembly as necessary.
2. Laser/Scanning Assembly.	Wavy, irregular-shaped characters, or irregular line margins in the scan direction of printing are usually a result of a defective Laser/Scanning Assembly.	Replace the Laser/Scanning Assembly.
3. Laser/Scanning Cable Assembly.	See explanation above.	Replace the Cable Assembly.
4. High-Voltage Corona stays on.	Improper charges on the EP drum surface can cause image distortion.	See Table 7-45, "High-Voltage System Checks."

Table 7-34. Repetitive Defects

POSSIBLE CAUSE	WHY	ACTION
1. EP-S Cartridge.	The circumference of the photoconductive drum (EP drum) is $3\frac{3}{4}$ inches. The circumference of the developer roller is 2 inches. If a defect appears in the print image at these intervals, assume the defect is associated with the EP-S Cartridge.	Replace the EP-S Cartridge. Refer to the "Repetitive Image Defect Ruler" drawing in Section 7-7 for additional hints.
2. Fusing Assembly.	The Fusing Roller's circumference is approximately $3\frac{1}{16}$ inches. If a defect appears at this interval, assume the defect is associated with the Fusing Assembly.	Clean the Fusing Assembly rollers. Replace the assembly if necessary.
3. Dirty Roller.	Any dirty roller along the paper path may result in a pattern of repetitive print image defects.	Examine and clean rollers along the paper path. Refer to "Repetitive Image Defect Ruler" drawing in Section 7-7.
4. Bad High-Voltage Power Supply Assembly or DC Controller.	A "soft" HVPS may leave inadequate charges on the EP drum or may not properly charge the developer roller. If the Primary or Transfer Coronas are left on when the printer is idle, repetitive image defects will appear.	Replace the HVPS. If the problem persists, replace the DC Controller.

Table 7-35. Black Pages with Horizontal White Stripes

POSSIBLE CAUSE	WHY	ACTION
1. Defective (damaged) Fiber Optic Cable.	This unique printout results from a defective or damaged Fiber Optic Cable. The pattern results from the printer's firmware attempting to locate Beam Detect (the horizontal synchronization signal). The white horizontal lines result from retry efforts by the firmware (e.g., the turning on/off of the laser) in an attempt to locate Beam Detect. The black areas show where the laser is continuously on, discharging the surface of the drum. This printout is usually associated with a 51 ERROR.	Ensure the Fiber Optic Cable is properly seated. If the error persists, replace the Fiber Optic Cable.
2. Laser/Scanning Assembly or DC Controller PCA.	See explanation in step 1 above.	Replace the Laser/Scanning Assembly followed by the DC Controller PCA, if necessary.

Table 7-36. Image Skew

POSSIBLE CAUSE	WHY	ACTION
1. Paper Tray.	If paper is carelessly installed in the paper tray or the paper tray is loosely installed in the printer, paper movement will be hindered as the paper enters the Registration Assembly.	Inspect the paper tray. Verify that the tray is correctly loaded and not overfilled. Verify that the tab in the upper left corner of the tray is not bent out of position. Verify that the paper tray is fully seated into the printer. Switch trays with another printer to verify that the problem follows the tray.
2. Worn Feed Roller Assembly.	If the Paper Pickup Roller or associated clutch is sufficiently worn, the leading edge of the paper may be skewed before it reaches the Registration Rollers.	Replace the Feed Roller Assembly.
3. Registration Assembly torsion springs.	The Registration Assembly torsion springs ensure that equal pressure is applied to both ends of the upper and lower Registration Rollers. If one of the springs is missing or defective, unequal pressure would be applied to the paper along the length of the roller. The paper should advance through the assembly in a uniform manner. Since one side of the paper advances ahead of the other side of the paper, the image would appear skewed on the paper.	Inspect the Registration Assembly's torsion springs to verify correct installation. If the springs are out of position, reinstall. If correctly installed but the image is still skewing beyond its specification, replace the Registration Assembly. If the fault condition persists, refer to the "Registration Check" toward the end of this section.

Table 7-37. Improperly Sized Image

POSSIBLE CAUSE	WHY	ACTION
1. Paper Tray Microswitches.	The purpose of the paper tray microswitches is to indicate to the DC Controller PCA what size paper tray is installed. The DC Controller will then use this information to format the print image to the size of the paper installed in the tray. If the paper tray microswitches are defective, the DC Controller is receiving false information and will format the print image to an improper size.	Perform the "Tray Size Switches (SW201, SW202, SW203) Functional Check" in Section 7-4. If envelopes are the problem, ensure the envelope size setting (displayed following insertion of an envelope tray) is set properly.

Table 7-38. Vertical Dark Streaks

POSSIBLE CAUSE	WHY	ACTION
1. Dirty Primary Corona wire.	A dirty Primary Corona wire will leave areas under the contaminated portion with an inadequate charge to repel unwanted toner.	Clean the Primary Corona wire.
2. Bad EP-S Cartridge.	Contaminants lodged within the cartridge or improper manufacturing (or refilling) can cause non-uniform characteristics.	Replace the EP-S Cartridge.
3. Incompatible forms.	During forms manufacture, inks or other finishing processes may interfere with the electrophotographic (EP) or fusing process.	Change type of form. Hint: Check the Fuser Cleaning Pad for contaminant buildup.

Table 7-39. Character Voids

POSSIBLE CAUSE	WHY	ACTION
1. Bad transparencies.	Transparencies will exhibit this problem if they are not designed for proper toner adhesion.	Use Hewlett-Packard-approved transparencies (refer to Chapter 2, Section 2-6).
2. Bad paper lot.	The surface of the paper may be too smooth for proper toner adhesion.	Try a known paper from a known source (see Chapter 2, Section 2-4).
3. Poor fusing.	Toner may not be properly fused to the media.	Perform the "Fusing Check" at the end of this section.

Table 7-40. Background

POSSIBLE CAUSE	WHY	ACTION
1. Dirty Primary Corona wire.	A dirty Primary Corona wire will prevent adequate charging of the EP drum's surface to repel toner.	Clean the Primary Corona wire.
2. Defective EP-S Cartridge.	The EP-S Cartridge may be internally damaged.	Replace the EP-S Cartridge.
3. Bad paper lot.	The paper moisture content, conductivity, or surface finish may be incompatible with the electrophotographic process.	Try a different paper lot (see Chapter 2, Section 2-4 ("Paper Specifications")).
4. Print Density set incorrectly.	If the Print Density is set incorrectly, then background scatter can result, particularly with envelopes.	Adjust the Print Density (see Chapter 4, Section 4-9, "Print Density Adjustment").
5. Inside of printer dirty.	If toner dust has leaked out of the EP-S-Cartridge, this problem can occur.	Clean the inside of the printer (see Chapter 4, Section 4-4, "Cleaning the Printer").

Table 7-41. Smudged Band with Overprint

POSSIBLE CAUSE	WHY	ACTION
1. Worn Feed Roller Assembly.	The plastic idler wheels can grab the paper feed D-roller as the Registration Assembly is trying to pull paper through the printer. If the D-roller is turned sufficiently, it can momentarily prevent normal paper movement.	Replace the Feed Roller Assembly and Separation Pad.

Table 7-42. Black Stripe on Right Side of Page

POSSIBLE CAUSE	WHY	ACTION
1. Dirty Primary Corona wire.	Drum surface cannot be charged where corona wire is contaminated.	Clean Primary Corona wire (see Chapter 4, Section 4-4).

Table 7-43. White or Blank Pages

POSSIBLE CAUSE	WHY	ACTION
1. EP-S Cartridge.	No toner is available for print.	Replace the EP-S Cartridge.
2. Sealing tape not removed.	No toner is available for print.	Remove tape.
3. Broken Transfer Corona wire or no Transfer Corona voltage.	Without Transfer Corona voltage, toner cannot be attracted from the surface of the drum to the paper.	Perform the "Image Development (Half Self Test) Functional Check" which follows to check all other EP processes.
4. No Developing Bias.	The Developing Bias applies a charge to the developing cylinder which, in turn, passes a charge to the toner. The charged toner particles are attracted to the neutralized surface areas of the drum previously discharged by the laser. If the charge on the toner is missing, toner will not be attracted to the drum and the page will be totally white.	Refer to Table 7-45, "High-Voltage System Checks."
5. No drum ground path.	If the drum ground discharge path is interrupted, the laser light's discharging effect cannot occur and the highly negative charge placed on the drum by the Primary Corona will repel toner, leaving a white page.	Refer to Table 7-45, "High-Voltage System Checks."
6. Drum is not rotating.	If the drum does not rotate, the page will be white because the EP process functions will not have occurred.	Perform the "Drum Rotation Functional Check" which follows.
7. High-Voltage System shorted-to-ground.	When the Transfer Corona is shorted-to-ground, the current-limiting circuitry within the High-Voltage Power Supply Assembly disables all EP process functional voltages. Without these voltages, none of the EP process functions will occur.	Thoroughly clean or replace the Transfer Corona Assembly.
8. Bad Laser/Scanning Cable Assembly.	Low-level signals exchanged between the Laser/Scanning Assembly and the DC Controller may be affecting laser output.	Replace the Laser/Scanning Cable Assembly.
9. Bent Top Cover Assembly Hinge Brackets.	With bent Hinge Brackets, the Beam-to-Drum Mirror may improperly reflect the laser beam or the drum drive gear may not engage.	Replace the Top Cover Assembly Hinge Brackets.
10. Blocked Laser Beam.	If the Beam-to-Drum Mirror or EP-S Cartridge shutters do not open when the EP-S Cartridge is installed, the beam will not reach the drum, resulting in an all-white page.	Verify the laser beam is not blocked from striking the EP drum (see the following "Beam-to-Drum Mirror Assembly Functional Check").

Image Development (Half Self Test) Functional Check

The EP process can be subdivided into the following stages (see Chapter 5, Section 5-2):

- Cleaning (Physical and Electrostatic).
- Conditioning (Primary Corona and grid).
- Writing (Laser Modulation).
- Development (Formation of the Toner Image).
- Transfer (Transfer Corona charge to transfer the image to paper).

The purpose of the Half Self Test Check is to determine which of the EP processes are functioning. Perform the test as follows:

1. Press the TEST PRINT button.
2. After the paper has advanced halfway through the printer (the leading edge of the paper should have advanced at least past the Transfer Corona), open the Top Cover Assembly.
3. Open the EP-S Cartridge's drum shield (see Figure 7-27) to view the drum's surface.

If a dark and distinct toner image is present on the drum's surface, assume that the first four functions of the EP process are functioning, concentrate troubleshooting efforts to a transfer problem, and proceed to Table 7-46. If the drum image is faint, verify proper laser power per the "Laser Power Verification" in Section 7-4, followed by the "High-Voltage System Checks," (Table 7-45) in this section. If NO image is present on the photoconductive drum, concentrate troubleshooting efforts on the earlier stages of the EP process as follows:

Drum Rotation Functional Check

The photoconductive drum, located in the EP-S Cartridge, must rotate for the EP process to function. The photoconductive drum receives its drive from the Main Motor gear train. To verify whether the drum is rotating, proceed as follows:

1. Open the printer's Top Cover Assembly. Open the EP-S Cartridge's drum shield (cover) to view the photoconductive drum.
2. With a felt-tipped marker, draw a line on the *edge* of the drum (away from the print image area). Note the position of the line.
3. Close the printer and power it on. The one-second start-up sequence should rotate the drum enough to move the mark. Open the printer and inspect the drum. Verify that the mark drawn in Step 2 of this procedure has moved.

If the mark has not moved, inspect the gear train to ensure that it is meshing with the EP-S Cartridge gears. If the Main Motor and drive gears appear to be functional and yet the EP drum does not move, the Top Cover Assembly Hinge Brackets may have been bent and require replacement.

Beam-to-Drum Mirror Assembly Functional Check

In order for the laser beam to reach the surface of the EP drum after it exits the Laser/Scanning Assembly, it must reflect off a properly positioned Beam-to-Drum Mirror. The mirror is normally blocked by the Mirror Shutter Assembly. When an EP-S Cartridge is installed, it contacts a lever on the left side of the Mirror Shutter Assembly, allowing the shutter to fall away from the mirror when the Top Cover Assembly is closed.

With the Top Cover Assembly opened to its 45° position and the EP-S Cartridge removed, gently push the bottom of the shutter locking assembly on the left side of the Mirror Shutter Assembly. If the shutter does not fall away from the mirror, check for the source of the binding and resolve. (See Figure 7-26).

Ensure that the Mirror Assembly is installed properly between the EP-S Cartridge Guide and the Top Cover Assembly and that it is positioned on its guide pins as described in Chapter 6.

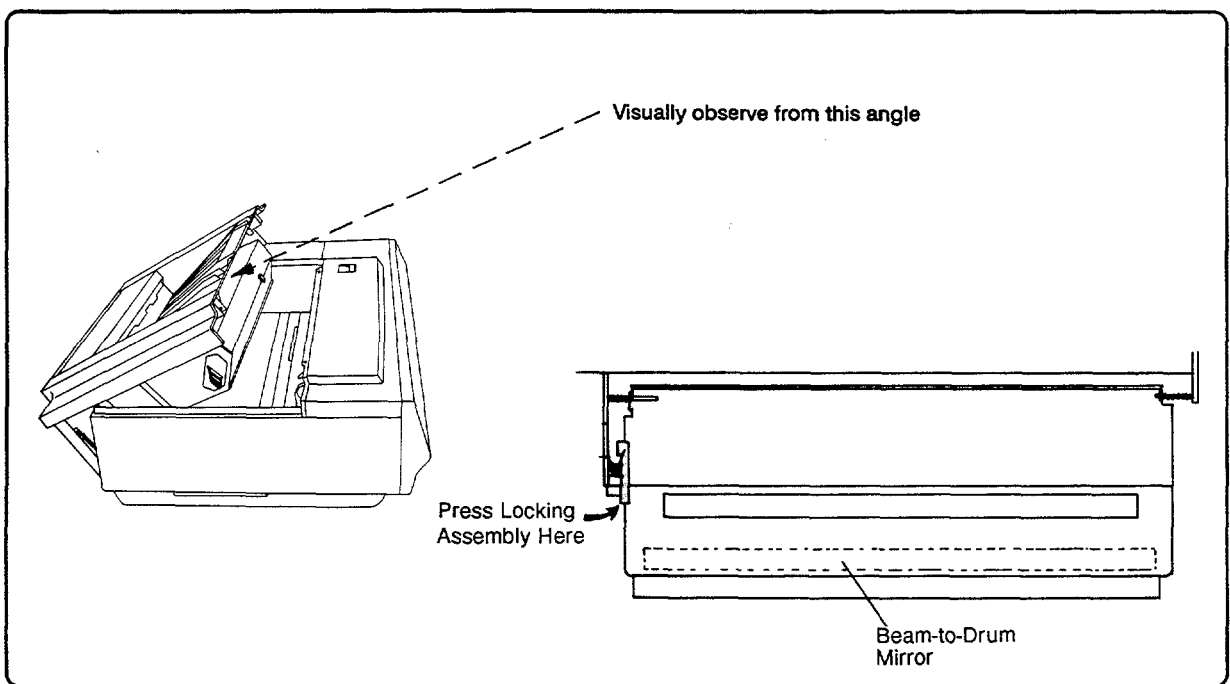


Figure 7-26. Beam-to-Drum Mirror Assembly

EP-S Cartridge Guide Functional Check

Whenever an EP-S Cartridge is installed in the EP-S Cartridge Guide in the Top Cover Assembly, protrusions on the right side of the guide are used to open two shutters on the top side of the EP-S Cartridge: the Erase Lamp Shutter and the Beam Shutter. As the Top Cover Assembly is closed, a protrusion in the base of the printer opens the drum shutter (or shield) on the bottom of the EP-S Cartridge.

With the Top Cover Assembly open at 45°, slowly slide an EP-S Cartridge in to the cartridge guide and, looking over the top of the EP-S Cartridge, note whether both shutters are opening properly. If all is well, the surface of the EP drum should be visible when looking directly over the top of the installed EP-S Cartridge (see Figure 7-26).

High-Voltage Power Supply Assembly

The High-Voltage Power Supply Assembly provides the necessary voltages for the printer's electro-photographic processes. Chapter 5 of this manual provides a summary of functional theory describing how the EP process works. The +24B Vdc supply is used to power the High-Voltage Power Supply Assembly. A summary of the major components of the high-voltage system and their functions is given in the table below.

Table 7-44. High-Voltage Power Supply Assembly Summary

COMPONENT	FUNCTION
1. Primary Corona.	Deposits a negative charge on the drum's surface.
2. Primary Corona Grid.	The grid ensures that the negative charges provided by the Primary Corona are applied evenly to the drum's surface. The grid, which consists of a metal screen, is tied to ground potential through a varistor in the High-Voltage Power Supply Assembly. The varistor becomes highly conductive at voltages above its breakdown point. This characteristic allows the varistor to bleed off excess corona current and maintain a uniform, fixed voltage on the drum's surface.
3. Drum ground.	Provides a discharge ground path for the drum's surface charge through the photoconductor after being struck by the laser or the erase lamps.
4. Developing bias.	The developing bias consists of a variable negative DC bias and a superimposed AC square wave bias. This bias is applied to the developer roll within the EP-S Cartridge. Toner particles, within the developer, obtain this negative bias by rubbing against the developer roll. The AC bias applied to the developer helps the toner overcome the magnetic attraction of the developer roll and assists in the toner projection process.
5. Transfer Corona.	Deposits a positive charge to the back of the paper to attract the negatively charged toner from the drum's surface.
6. Toner Sensing.	Provides a variable voltage level to the DC Controller, depending on the toner level in the EP-S Cartridge.
7. Static Teeth.	A high negative potential is applied to a row of static teeth. These negatively charged teeth assist in discharging the positive charge placed on the paper at the transfer station. The result of this discharge action is to weaken the paper's attraction to the photoconductive drum.

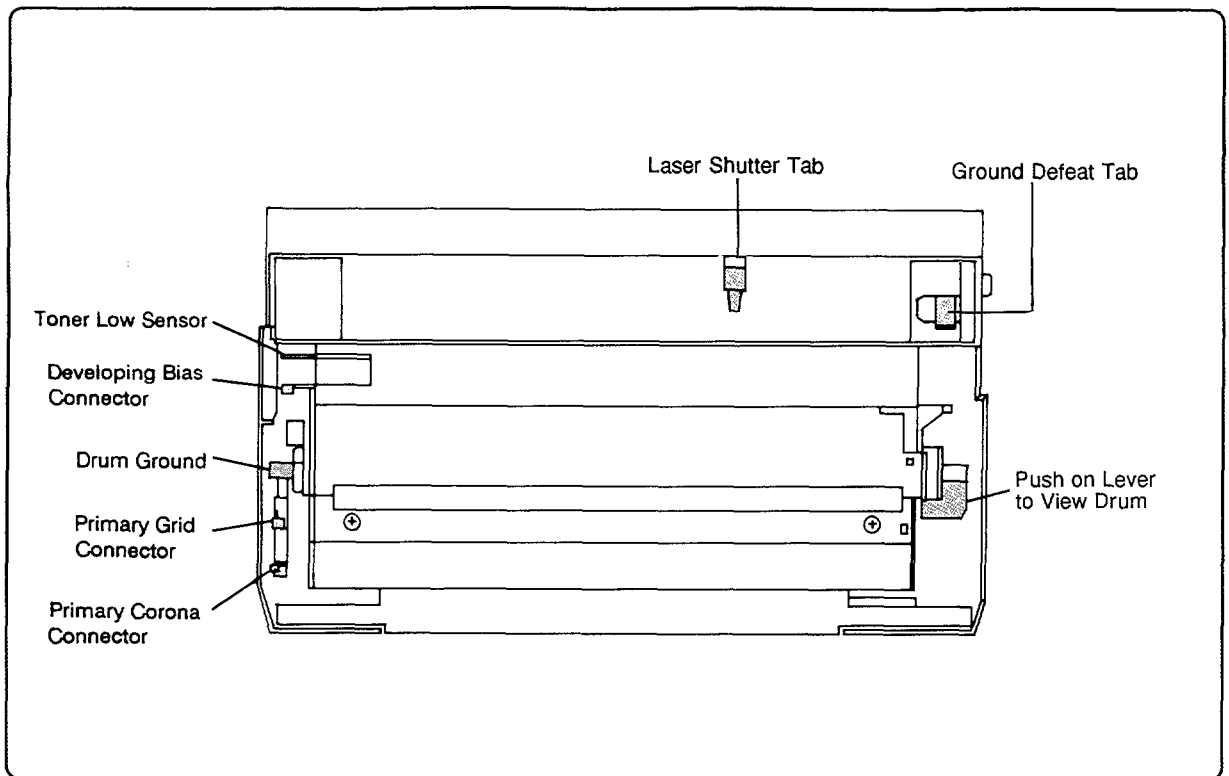


Figure 7-27. EP-S Cartridge (Bottom view)

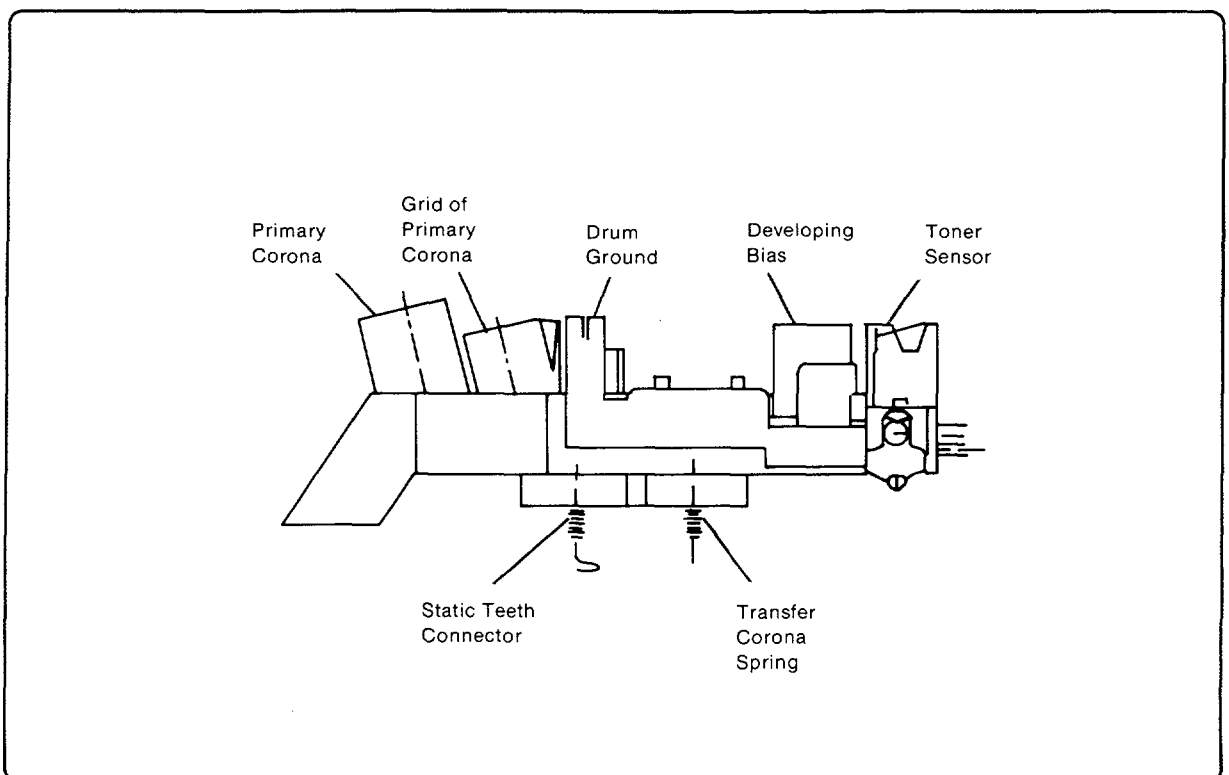


Figure 7-28. High-Voltage Power Supply Connector

Table 7-45. High-Voltage System Checks

CHECKS	ACTION
<p>1. Are any of the following supply connectors damaged, corroded, dirty, or missing?</p> <ul style="list-style-type: none"> ■ Primary Corona connector. ■ Primary Corona Grid connector. ■ Drum Ground connector. ■ Developing Bias connector. ■ Toner Level Sensor connector (and connecting wire). 	<p>Visually inspect each item. (See Figure 7-28). If any of the items are damaged, correct as necessary. Replace the High-Voltage Power Supply if the connection is unable to be corrected. Ensure that all wires are connected to their respective terminals.</p>
<p>2. Inspect the EP-S Cartridge and verify that the following connectors are not damaged, dirty, or missing:</p> <ul style="list-style-type: none"> ■ Primary Corona connector. ■ Primary Corona Grid connector. ■ Drum Ground connector. ■ Developer Bias connector. ■ Toner Sensing connector. 	<p>Visually inspect (see Figure 7-27). Correct, or if necessary, replace the EP-S Cartridge.</p>
<p>3. Is the Primary Corona wire broken, resulting in black pages?</p>	<p>Inspect. (See Figure 7-29.) If broken, replace the EP-S Cartridge.</p>
<p>4. Are the Light-Blocking shutters on the EP-S Cartridge opening? (A closed laser shutter will result in white pages.)</p>	<p>Inspect the EP-S Cartridge's top to verify that the shutter tabs are not broken or damaged (See Fig 7-29). Inspect the Top Cover Assembly to verify that the plastic protrusions which open the EP-S Cartridge shutters are not damaged.</p>
<p>5. Is the protective shutter concealing the Top Cover's reflecting mirror being released when the EP-S Cartridge is installed?</p>	<p>Install the EP-S Cartridge. Visually inspect to see if the mirror's protective shield swings open as the Top Cover Assembly is closed.</p>
<p>6. Is the Beam-to-Drum Mirror dirty?</p>	<p>Inspect the mirror. If dirty, clean per the procedure described in Chapter 4.</p>
<p>7. Is the High-Voltage Power Supply Assembly correctly seated into its connector to the DC Controller PCA?</p>	<p>Visually inspect. If necessary, remove the assembly to verify that all pins are in their respective connectors.</p>
<p>8. Is connector J211 on the DC Controller PCA properly connected?</p>	<p>Remove the bottom cover and visually inspect the connector. Reseat or replace if necessary.</p>
<p>9. Do the EP-S Cartridge's sensitivity switches function?</p>	<p>Refer to the "Drum Sensitivity Switches (SW301 and SW302) Functional Check" in Section 7-4.</p>
<p>10. Do the Erase Lamps function?</p>	<p>Perform the "erase lamp functional Check" which follows.</p>
<p>11. Do the Primary Corona, Developer AC Bias, and Developer DC Bias signals function?</p>	<p>Perform the "Primary Corona," "Developer AC Bias," and "Developer DC Bias" functional checks which follow.</p>

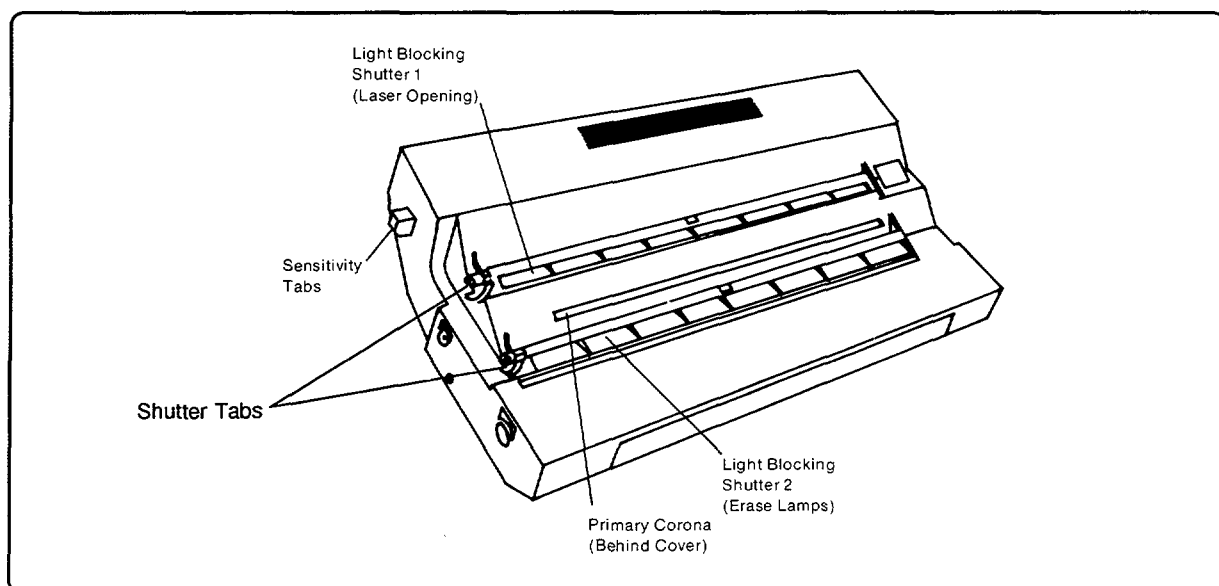


Figure 7-29. EP-S Cartridge (End view)

Primary Corona Functional Check

Verify that the Primary Corona ($\overline{HV1ON}$) enable signal on the High-Voltage Power Supply Assembly is functioning as follows:

1. Using a voltmeter and frame ground as a reference, measure the voltage level at J210-8 (Test Connector, see Figure 7-30) on the DC Controller PCA while performing a Test Print. The voltage level should switch between +18.0 Vdc (disabled state) and 0.0 Vdc (enabled state) one second after the print cycle begins. If the voltage at J210-8 does not switch, replace the DC Controller PCA. If the signal line is being switched but the Primary Corona does not appear to be functioning (i.e., producing black pages), replace the EP-S Cartridge followed by the High-Voltage Power Supply Assembly.

Developer AC Bias Functional Check

Verify that the Developer AC Bias (\overline{DBAC}) enable signal on the High-Voltage Power Supply Assembly is functioning as follows:

1. Using a voltmeter and frame ground as a reference, measure the voltage level at J210-6 (Test Connector, see Figure 7-30) on the DC Controller PCA while performing a Test Print. The voltage level should switch between +18.0 Vdc (disabled state) and 0.0 Vdc (enabled state) three seconds after the print cycle begins. If the voltage at J210-6 does not switch, replace the DC Controller PCA. If the signal line is being switched but the developer AC bias does not appear to be functioning (i.e., producing very faint print), replace the EP-S Cartridge followed by the High-Voltage Power Supply Assembly.

Note



The absence of the Developer AC Bias will also result in a perpetual 16 TONER LOW condition.

Developer DC Bias Functional Check

Verify that the Developer DC Bias ($\overline{\text{DBDC}}$) enable signal on the High-Voltage Power Supply Assembly is functioning as follows:

1. Using a voltmeter and frame ground as a reference, measure the voltage level at J210-4 (Test Connector, see Figure 7-30) on the DC Controller PCA while initiating the printer Self Test. The voltage level should switch between +18.0 Vdc (disabled state) and 0.0 Vdc (enabled state) one second after the print cycle begins. If the voltage at J210-4 does not switch, replace the DC Controller PCA. If the signal line is being switched but the developer DC bias does not appear to be functioning (i.e., producing extremely faint or white pages), replace the EP-S Cartridge followed by the High-Voltage Power Supply Assembly.

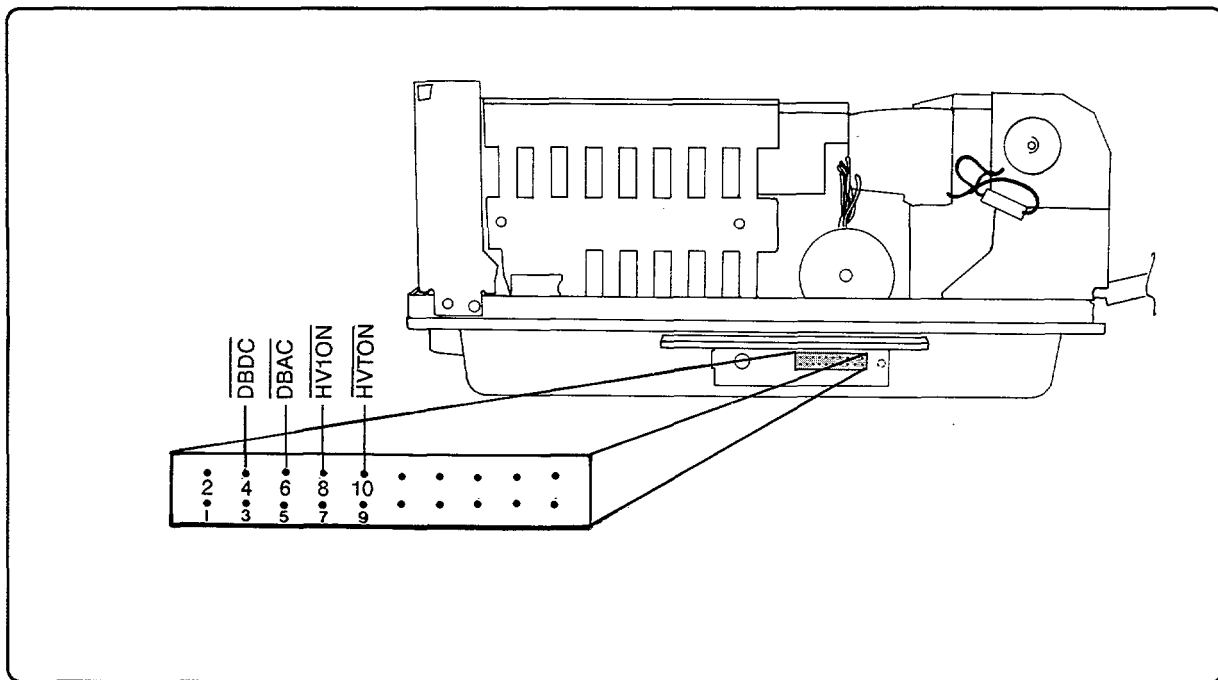


Figure 7-30. J210 Test Points

Note



Functionality of the DC Controller's high-voltage control circuitry can be readily verified using the *LaserJet Series II Service Diagnostic Tool Kit*, P/N 33440-67905, and following the instructions therein.

Transfer Corona

The Transfer Corona applies a positive charge to the back of the paper during the transfer process to attract the toner image from the surface of the photoconductive drum to the paper. The High-Voltage Power Supply Assembly provides the voltage applied to the Transfer Corona Assembly. The main microprocessor on the DC Controller PCA enables the Transfer Corona via the HIGH-VOLTAGE TRANSFER ON (HVTON) signal, which occurs approximately two seconds after the PRNT command is issued by the Interface/Formatter PCA. The Transfer Corona remains on until all printing is complete.

Table 7-46. Transfer Corona Checks

CHECKS	ACTION
1. Is the High-Voltage Power Supply Assembly correctly seated into its connectors to the DC Controller PCA?	Visually inspect. If necessary, remove the assembly to verify that all pins are in their respective connectors.
2. Is the Transfer Corona wire broken?	Inspect. If the wire is broken, replace the assembly.
3. Is the drum ground connector (see Figure 7-28) damaged?	Inspect. Replace the High-Voltage Power Supply Assembly if necessary.
4. Are the Transfer Corona Assembly spring connectors (located on the bottom of the High-Voltage Power Supply Assembly connector arm) dirty or bent?	Remove the High-Voltage Power Supply Assembly. Inspect the Transfer Corona spring connections (see Figure 7-28). Straighten or clean the connectors if necessary.
5. Is the DC Controller PCA defective?	See the "Transfer Corona Functional Check" which follows.

Transfer Corona Functional Check

Verify that the Transfer Corona enable signal (HVTON) on the High-Voltage Power Supply Assembly is functioning as follows:

- Using a voltmeter and frame ground as a reference, measure the voltage level at J210-10 (Test Connector, see Figure 7-30) on the DC Controller PCA while initiating the printer Self Test. The voltage level should toggle between +18.0 Vdc (disabled state) to 0.0 Vdc (enabled state) two seconds after the print cycle begins. If the voltage at J210-10 does not toggle, replace the DC Controller PCA. If the signal line is being switched but the Transfer Corona does not appear to be functioning (i.e., producing a clear image on the drum but faint or white pages), replace the High-Voltage Power Supply Assembly followed, if necessary, by the Transfer Corona Assembly.

Erase Lamp Functional Check

The Erase Lamps receive their operating voltage through connectors J333 and J334 on the Exit Sensor PCA.

1. Remove the Main Body Covers or, at a minimum, the left cover panel.
2. Remove the EP-S Cartridge and close the Top Cover Assembly.
3. Power on the printer.
4. Observe the Erase Lamps through the left side opening. If the lamps are functioning, an orange glow may be observed for about one second following powerup. If the orange glow is not observed, verify that the Erase Lamp contacts are fully contacting the Exit Sensor PCA. If the lamps still appear to be malfunctioning, replace the following assemblies in the order listed:
 - a. Exit Sensor PCA.
 - b. Erase Lamp Assembly.
 - c. DC Controller PCA.
 - d. Cable assembly between the Exit Sensor PCA and the DC Controller PCA.

Image Quality Check

Perform an "Image Quality Check" as follows:

1. Ensure that a properly stored, reliable copier bond paper (e.g., Xerox 4024, Canon NP, etc.) is installed in the printer.
2. Run several copies of the Service Mode Self Test. (See Chapter 3, Section 3-7, for instructions.)
3. Inspect the solid and shaded gradient areas in the four corners of the Service Mode Self Test printout. The solid areas should be uniform in density with no fading from one side of the printout to the other. The four corner gradient patterns should appear uniform. If uniform density is not being observed, perform the following:
 - a. Remove and rock the EP-S Cartridge about its long axis (see Chapter 2, Section 2-3).
 - b. Clean the Transfer and Primary Corona wires (see Chapter 4, Section 4-4).
 - c. Ensure that the Beam-to-Drum Mirror is clean.

If the preceding actions do not correct the density problems, replace the EP-S Cartridge, followed by the Transfer Corona Assembly, High-Voltage Power Supply Assembly, and Laser/Scanning Assembly as necessary.

Paper Overview

The major variable in the print quality formula is paper. Table 7-47 provides a list of paper checks that should be made prior to troubleshooting for printer malfunctions.

Table 7-47. Paper Checks

CHECKS	ACTION
1. Are the print quality problems related to a specific type of paper?	Both printers are specifically designed to work with high quality copier bond papers. Try using an alternate brand of paper to determine if print quality problems are associated with a specific type of paper.
2. What is the printer's operating environment like with respect to: ■ Temperature. ■ Humidity. ■ Sunlight exposure. ■ Cleanliness.	Paper assumes the properties of its environment (e.g., if the operating environment is excessively humid, the paper absorbs this humidity). Examine the environment to determine whether any of the items listed could affect the paper.
3. Are the correct paper handling practices being observed?	Paper should be stored in a clean, temperature controlled, and humidity controlled environment. Review the user's paper storage practices to determine if any specific practice may result in a paper problem.
4. Does the paper meet the paper specifications?	Review the paper specifications listed in Chapter 2, Section 2-4.

Paper Curl

Paper curl is inherent in the laser printing process because paper is subjected to heat on one surface causing it to dry and shrink more than the opposite surface. The curl is always towards the source of heat (i.e., toward the Fusing Roller). Curl tends to worsen over time as the paper cools.

Although paper curl cannot be completely eliminated, some steps may be taken to lessen its impact. If you feel that the curl in your printed output is greater than your expectations, try some of the following recommendations:

Table 7-48. Paper Curl

CHECKS	ACTION
1. Try using the printer's Face-Up (Rear) Output Tray.	By using the printer's Face-Up (Rear) Output Tray, the paper is transported through a straighter paper path after it has been subjected to the heat from the fusing station. This paper path tends to be less stressful on the paper, decreasing its tendency to curl.
2. Try turning the paper over.	The manufacturing process for paper results in two paper surfaces, the "wire side" and the "felt side." Because the felt side of the paper is usually the smoothest, it is the preferred print image surface. Depending upon the type of manufacturing process, one side of the paper may have a "manufactured curl." If you are experiencing paper curl with one surface of the paper, turn the paper over and see if excess curl is limited to a particular surface of the paper.
3. Review paper handling and storage conditions.	Over time, paper assumes the characteristics of its storage environment (e.g., if it is stored in a humid environment, the paper assumes this humidity, etc.). Review paper specification storage requirements. Evaluate actual storage conditions to determine if any of the environmental conditions could possibly result in paper curl. Note: Excessively "wet" paper (greater than 4 - 6% moisture content) will exhibit greater curl when heated.
4. Try using a different type of paper.	All papers are manufactured differently (e.g., different textures, moisture content, drying processes, material content, etc.). After changing types of paper, note if the tendency to curl is associated with any one specific type of paper.

Density Check

The perception of density (blackness) is subjective. For a service representative to evaluate the customer's print quality with respect to density, both the service person and the customer must judge the suspect problem from the same point of view. The following variables must be clarified or defined before a true evaluation can occur:

Table 7-49. Density Check Factors

ITEM	CONSIDERATION
1. Paper.	<p>Paper is one of the largest variables that may affect the perception of a density problem. All types of paper react differently to the laser imaging process. The surface texture, paper color (degree of whiteness), paper type, and moisture content all contribute to density perception.</p> <p>When addressing suspected density problems, both the service representative and the customer must evaluate the problem from the same reference point. It is important, therefore, that all density evaluations be made using the same type, if not the same lot, of paper. It is recommended that all evaluations be made using Xerox 4024 or Canon NP copier bond paper.</p>
2. Density Adjustment Dial.	<p>The printer's Density Adjustment Dial changes the developer DC bias and, therefore, the amount of toner attracted to the drum. For evaluating suspect density problems, ensure that all print samples are printed with the Density Dial set to the "5" (mid-range) position. (See Chapter 4, Section 4-9.)</p>
3. Environmental Conditions.	<p>Although difficult to duplicate, factors such as printer location (with respect to sunlight, humidity, and temperature) should not be ruled out regarding their contribution to print quality.</p>
4. Perceived Density versus Optical Density.	<p>A difference in perceived density versus optical density is often evident when someone is asked to judge bold print versus italic print. In most cases, bold print is judged to be more dense just because the stroke weight is heavier and not because the toner is "blacker."</p> <p>To eliminate the perceived density phenomenon, all density comparisons should be made using the same print patterns. It is recommended that all density evaluations be based on the Service Mode Self Test Printout.</p>
5. EP-S Cartridge.	<p>A new EP-S Cartridge will appear to print slightly darker than the last pages of a fully used (approximately 4,000 pages) cartridge. This is due to the individual dot sizes being slightly larger on a well used cartridge. This condition is the result of a progressive "blooming" effect caused by the continued working of the laser on the drum's photoconductive material.</p>
6. Resolution Enhancement. (HP 33449 only.)	<p>The Resolution Enhancement feature of the HP 33449 and the density adjustment affect each other. See Chapter 3, Section 3-4, for proper adjustment procedures.</p>

Registration Check

Registration is defined as the printer's ability to accurately position the printed image on the paper. The border printed on the Control Panel or Service Mode Self Test printout defines the print image area. This border also provides a convenient reference to measure print image registration. The following registration tolerances are allowed with the HP 33440 and HP 33449 printers.

Table 7-50. Registration Specifications

TOLERANCE	LOCATION
5mm ± 2.5mm	Leading edge of the paper to the horizontal first line of dot row.
4.7mm ± 2mm (HP 33440)	Left edge of the paper to the first vertical dot row (for letter size paper).
4.0mm ± 2mm (HP 33440)	Left edge of the paper to the first vertical dot row (for A4 size paper).
6.4mm ± 2mm (HP 33449)	Left edge of the paper to the first vertical dot row (for letter size paper).
6.0mm ± 2mm (HP 33449)	Left edge of the paper to the first vertical dot row (for A4 size paper).

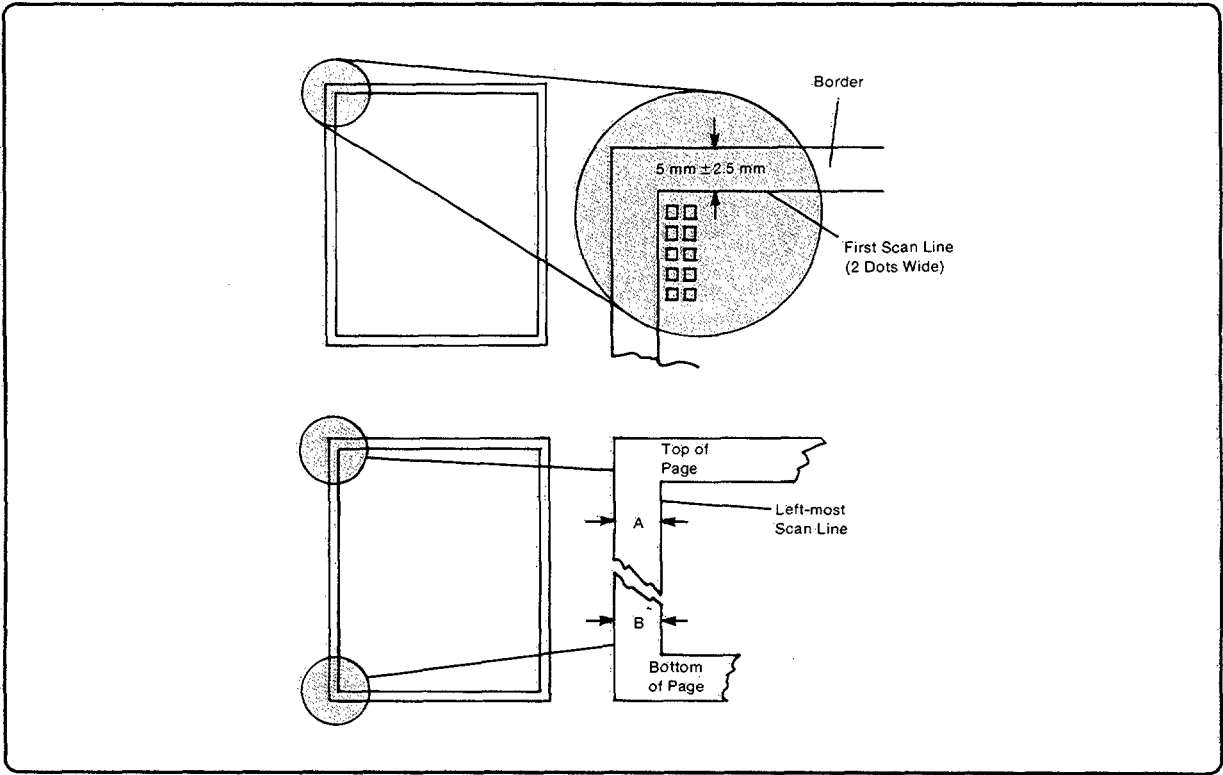


Figure 7-31. Registration Specifications

Skew Tolerance

All vertical lines should be parallel to the left edge of the paper. In Figure 7-31, dimension A should not vary from dimension B by more than 1.5mm (0.06 in.) over a paper length of 260mm (10.25 inches).

Procedure

Run the printer Control Panel continuous Self Test (04 SELF TEST).

If misregistration is suspected, measure the left and top margins and compare the measured values with the listed specifications. If, in comparison, misregistration is confirmed, proceed as follows:

1. Closely examine the paper path gear train. Inspect for worn or excessively dirty gears. Replace or clean if necessary.
2. Inspect the Paper Pickup Roller. If worn, replace the Feed Roller Assembly and Separation Pad.
3. Verify that the torsion springs are correctly mounted on the Registration Assembly.
4. If the preceding actions do not correct the misregistration problem, replace the Registration Assembly.

Note

There are no adjustments for skew or registration problems.



Fusing Check

The Fusing Assembly permanently bonds toner to the paper. To verify that the printer is correctly fusing the print image, proceed as follows:

1. Run ten continuous copies of the Control Panel Self Test.
2. Place the printout on a firm surface and, using your fingertips, vigorously rub the first and the tenth printout. Inspect for any evidence of smearing. The text should be permanently fused on both printouts. No smearing should occur.

If the level of fusing from the first printout varies from that of the tenth printout, clean the Fusing Assembly's Thermistor and repeat the fusing check. If the difference in levels of fusing persists, replace the Thermistor/Exit Sensor PCA.

If smearing occurs in all printouts, replace the Fusing Assembly.

If the problem continues, replace the DC Controller PCA.

Note

If the Thermistor Bypass Switch is not engaged when the Bottom Cover is in place, the DC Controller believes the fuser is at temperature and, therefore, the fusing lamp will not be activated. However, the printer will attempt to print "normally" in this condition.



7-6. INTERFACE TROUBLESHOOTING

Communications Check

Note



Except for a potentially bad Interface/Formatter PCA, communication problems are normally the customer's responsibility. Time spent attempting to resolve these problems will not be covered by the product's Hewlett-Packard warranty.

The Peripheral Products Assist Line (PPAL) is available to the customer at no charge to help them through these problems. The PPAL telephone number is: (208) 323-2551.

If the printer is not connected to an MS-DOS-based host, proceed to Table 7-51 (Communications Checks).

Test Message

After the printer is installed, verify communications between the printer and the computer using MS-DOS by entering the following at the computer:

```
Type:      <Prompt> COPY CON: LJTEST 
Type:      LASERJET COMMUNICATIONS OK! 
Press:     CTRL Z (press the  key and the letter Z simultaneously)
Press:     
Displayed:  1 file(s) copied
Type:      <Prompt> PRINT LJTEST 
Displayed:  name list dev [PRN]
Press:     
```

The printer should print a page with the following text: "LASERJET COMMUNICATIONS OK!"
If the Communications Check fails, proceed as follows.

AUTOEXEC.BAT Standard Configuration Test

If the previous check did not produce the desired result, ensure that the AUTOEXEC.BAT file contains the following statements for serial interface communications:

```
MODE COM2 96 , N , 8 , 1 , P
```

In sequence, the parameters of this statement means:

```
COM2  PC Serial Communications Port 2.
96    Baud Rate ÷ 100 (9600).
N     Parity (none).
8     Word length (data bits)
1     Number of stop bits.
P     Continuous retries on time-out errors.
```

This statement redirects LPT1 output to the COM2 port:

MODE LPT1:=COM2:

Note



If COM2 is not available on your computer, substitute COM1 for COM2 in the above statements.

Configure the printer for RS-232 at 9600 baud. Hook it to the COM2 (or COM1) port on the PC using the appropriate cable and repeat the test message procedure above. See Appendix B or the pamphlet, *Your Guide to Setting up Your LaserJet III*, for the appropriate cable.

If the problem persists, proceed with the following checks in Table 7-51.

Table 7-51. Communications Checks

CHECKS	ACTION
<p>1. Is your computer configured to the following parameters (assuming a serial interface is used)?</p> <p>Start Bits = 1 Stop Bits = 1 Data Bits = 8 Parity = None</p>	<p>These parameters are required to communicate with the printer. Verify your computer's communications port configuration matches these parameters.</p> <p>Note: If these parameters are not set properly, it may also yield a 40, 20, or 22 ERROR on the printer's Control Panel.</p>
<p>2. Does the printer's baud rate match that of the computer's communications port?</p>	<p>Run the printer's Self Test to verify the baud rate setting. At the computer, verify that the baud rate is correctly set in any configuration files.</p> <p>Note: A baud rate problem may also yield a printer 40 ERROR.</p>
<p>3. Are you using the correct cable for communications between the computer and the printer?</p>	<p>See the cable wiring diagrams in Appendix D.</p> <p>Hint: On an RS-232 cable, pins 2 and 3 may need to be reversed at the printer-end of the cable.</p>
<p>4. Are you using the correct RS-232-C protocol?</p>	<p>During the communications "handshake," the printer transmits both the XON/XOFF signal and the DTR signal. The DTR (Data Terminal Ready) signal may be either negative going or positive going.</p> <p>DTR polarity is set at the printer's Control Panel. The XON may be set to normal (only transmitted when data is needed) or Robust XON (transmitted every second). This feature is also configurable from the Control Panel. DTR is available at pin 20 and XOFF is transmitted from pin 2 of the printer.</p>

Table 7-51. Communications Checks (continued)

CHECKS	ACTION
5. If using a serial interface, is the cable longer than 50 feet (15 meters)?	The maximum recommended cable length for RS-232 serial communications is 50 feet. Use RS-422 or move the printer closer to the host.
6. If using a Centronics parallel cable, is it over 10 feet (3 meters) long?	Consider using a serial interface connection or move the printer closer to the host.
7. Do all the current Control Panel Configuration Menu items match the host system's parameters?	Make appropriate changes. If host system changes are made, be sure to reboot the system or otherwise ensure the changes are in effect.
8. Does the printer have a bad interface port?	If possible, try a different printer interface than the one having a problem and reconfigure the printer and host.
9. Does the host have a bad interface port?	If possible, try a different host system port than the one having a problem and reconfigure both the host and printer appropriately.

If the host system and printer are still not communicating and steps 1 through 9 have been completed, replace the Interface/Formatter PCA and reconfigure the printer. If the problem persists, a protocol analyzer may be required to determine the source of the problem.

Caution



HP LaserJet printers are not designed to work with mechanical switch box products without proper surge protection. These devices can generate voltages in excess of standard interface specifications, causing permanent damage to the Interface/Formatter PCA. This circumstance is not covered by Hewlett-Packard warranty.

7-7. TROUBLESHOOTING AIDS

Repetitive Defect Ruler, HP 33440 and HP 33449

Repetitive print defects are usually associated with a specific roller within the printer or the EP-S Cartridge. The following diagram illustrates the diameters of the main printer rollers in a linear format. To use the diagram, align the first occurrence of the defect with the top of the "ruler" and measure to the next occurrence of the defect to determine the roller in question.

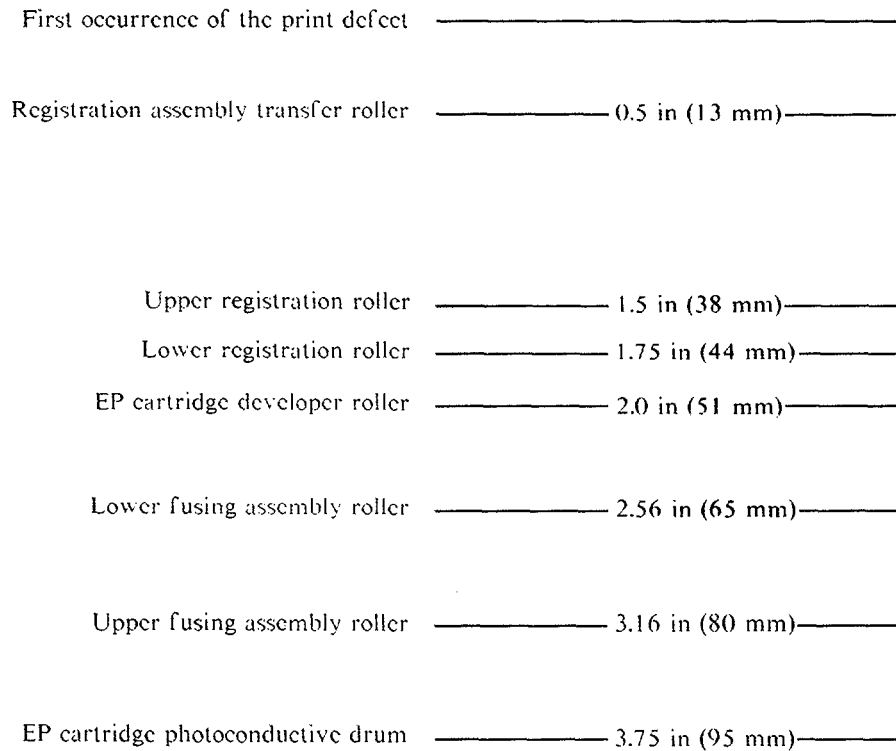


Figure 7-32. Repetitive Defect Ruler

Connector Location Diagrams

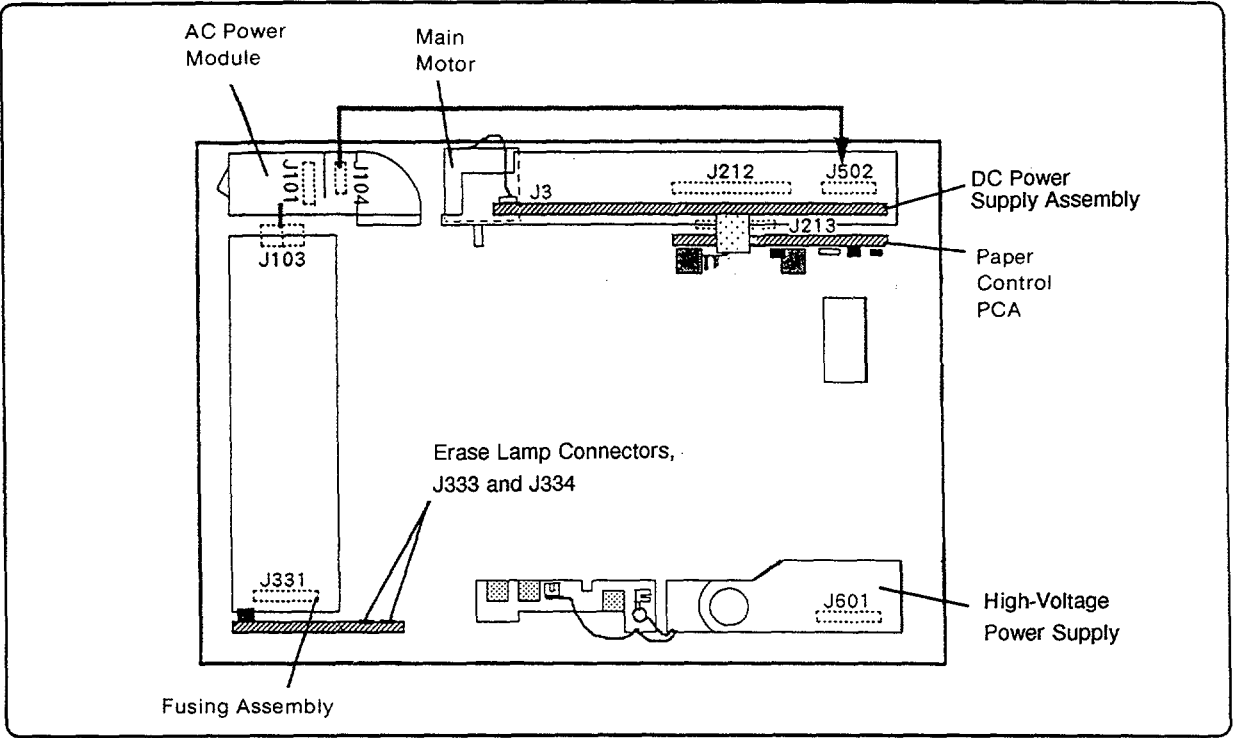


Figure 7-33. Printer Base Connectors (Top view)

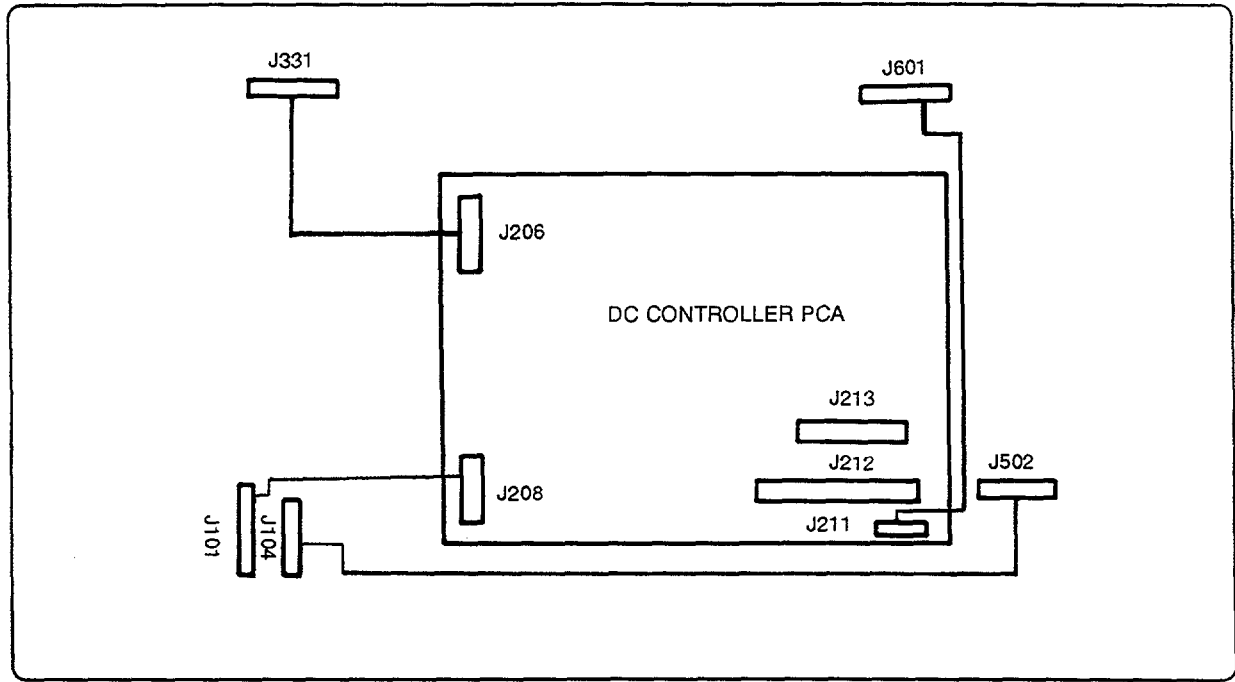


Figure 7-34. Printer Base Connectors (Bottom view)

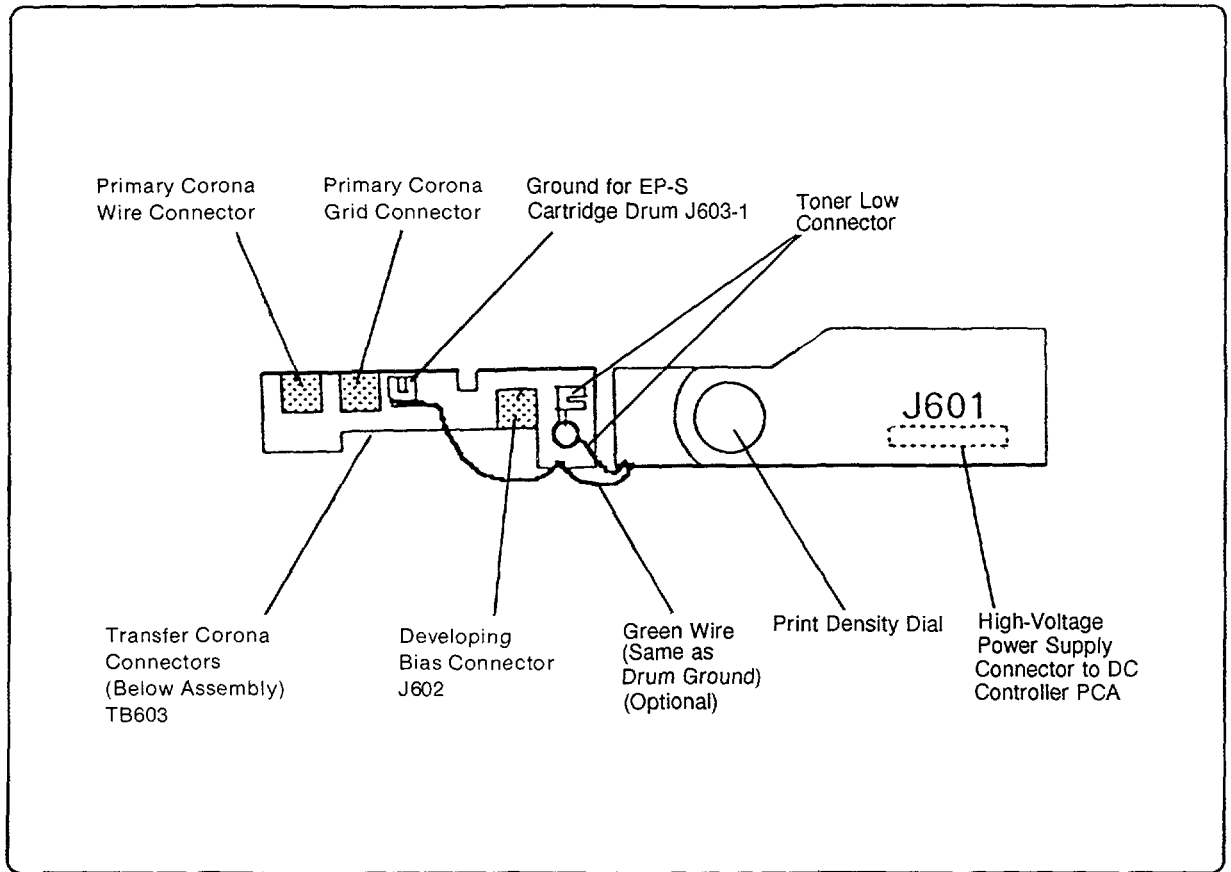


Figure 7-35. High-Voltage Power Supply Assembly (Top view)

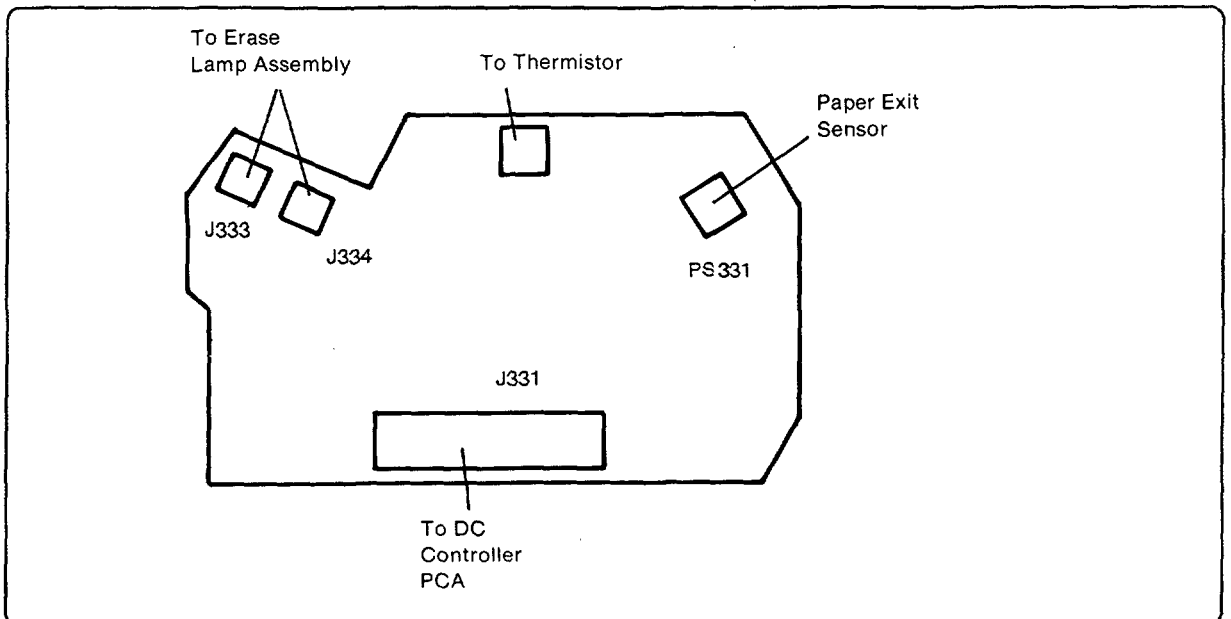


Figure 7-36. Exit Sensor PCA (Component side)

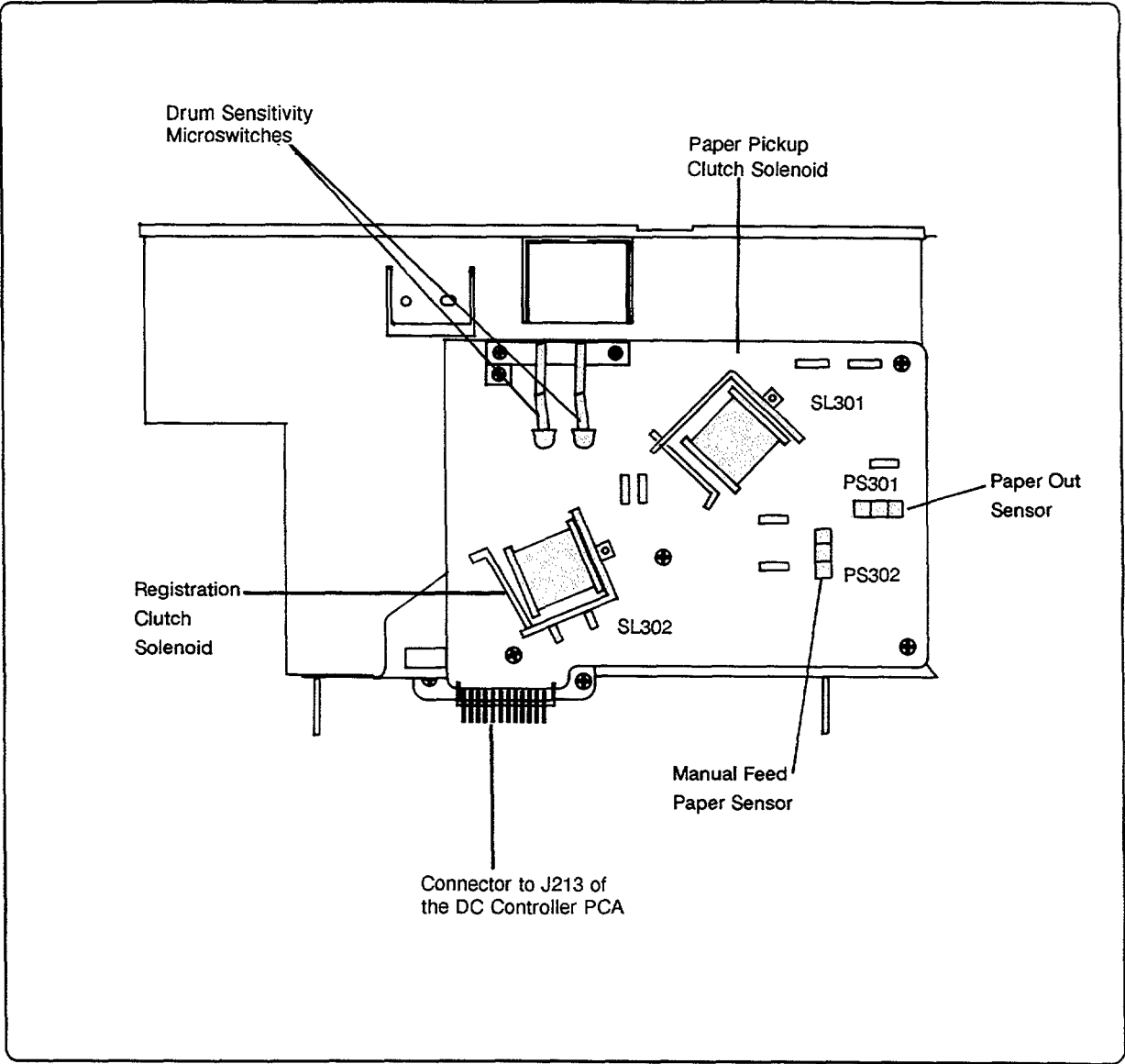


Figure 7-37. Paper Control PCA (Component side)

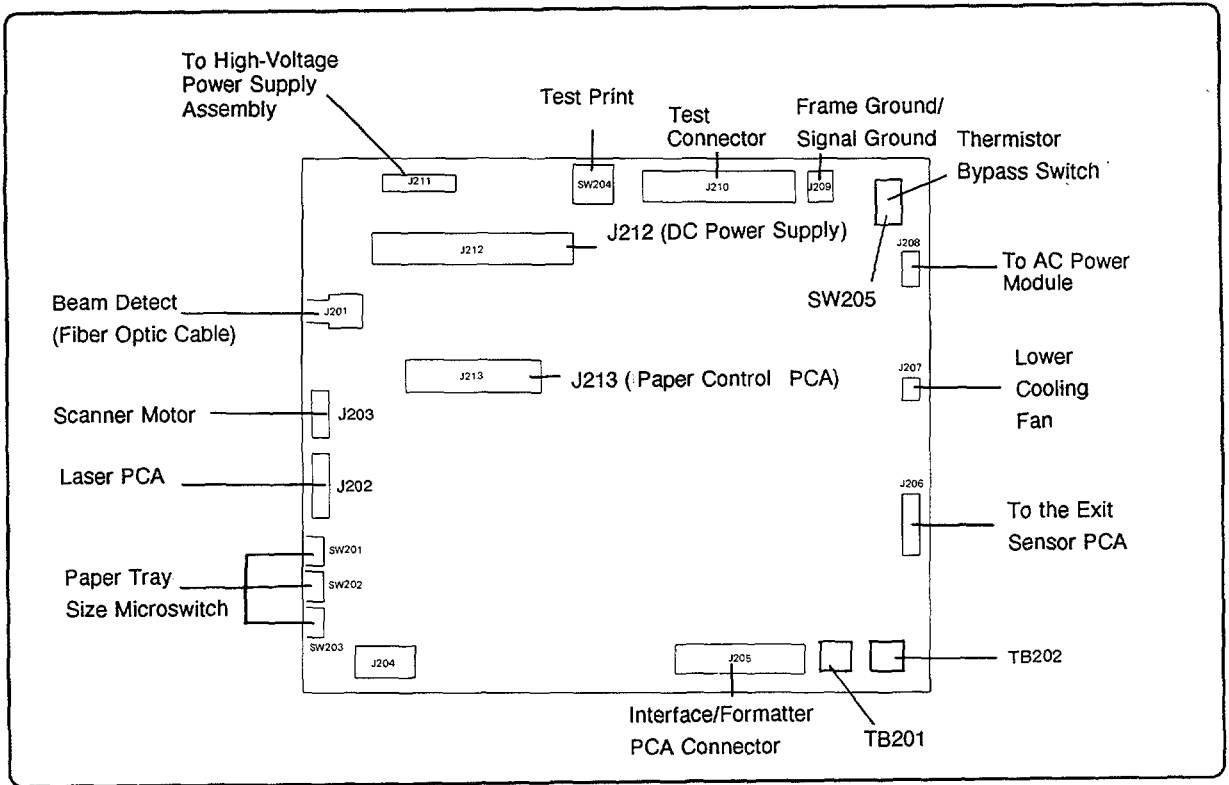


Figure 7-38. DC Controller PCA

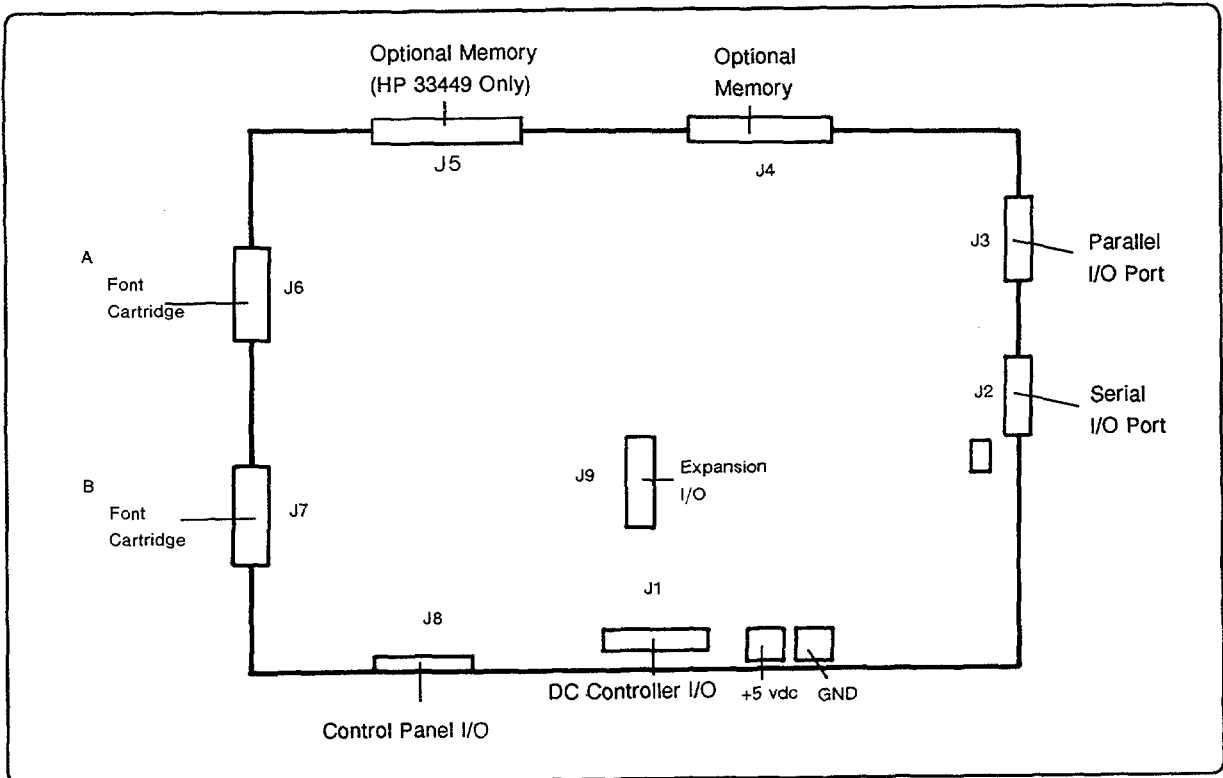


Figure 7-39. Interface/Formatter PCA

Printer Wiring Diagram, HP 33440 and HP 33449

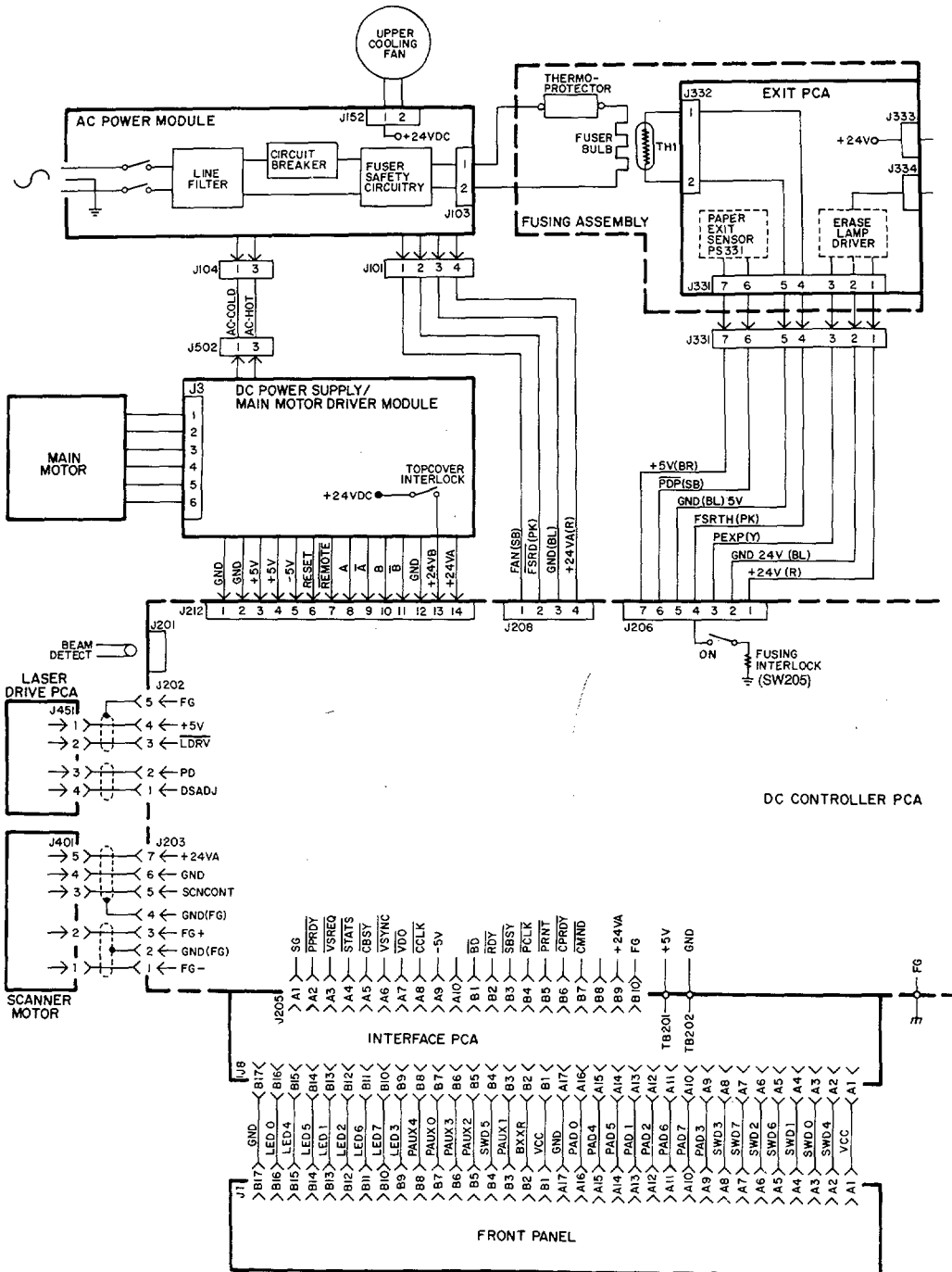
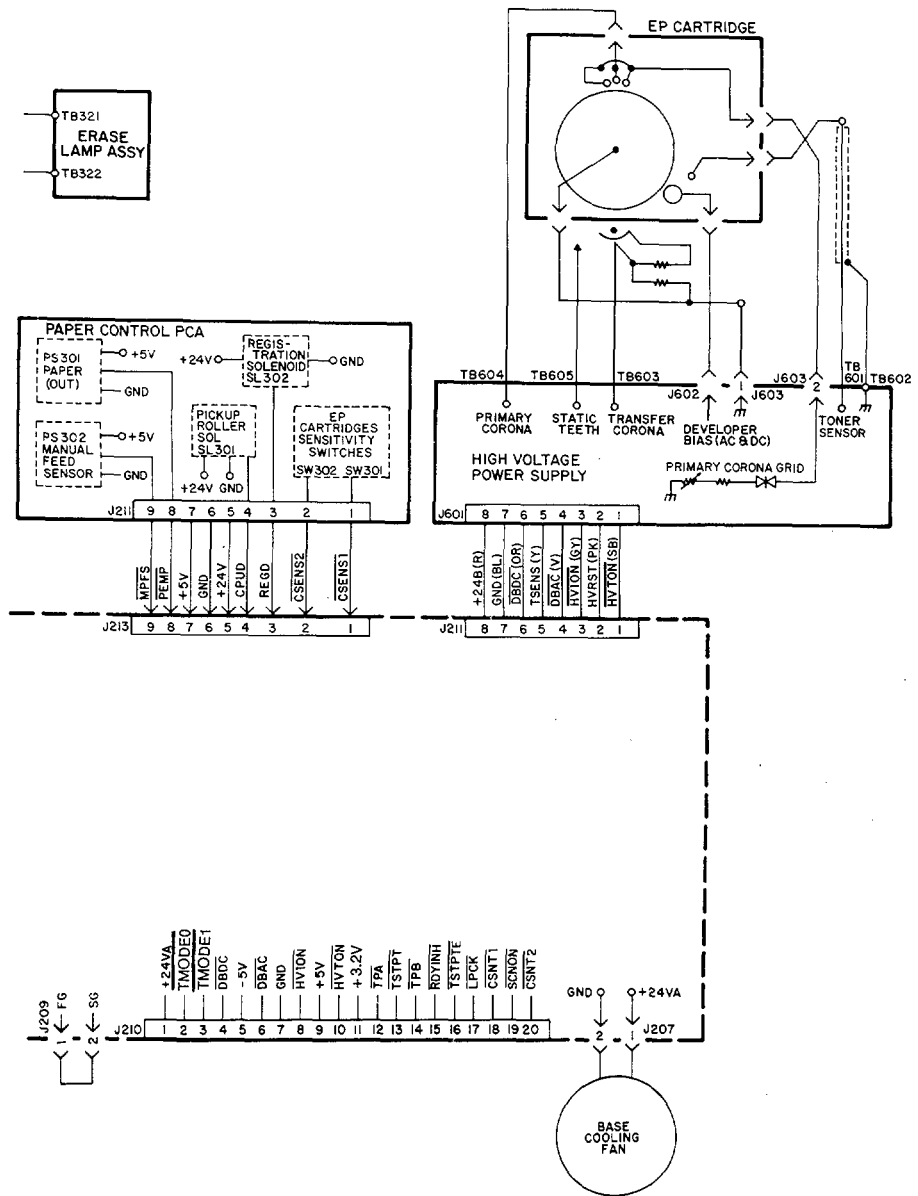


Figure 7-40. HP 33440/HP 33449 Printer Wiring Diagram (1 of 2)



HP 33440/HP 33449 Printer Wiring Diagram (2 of 2)

DC Controller Signal Listing Chart, HP 33440 and HP 33449

Table 7-52. LED 201 and SW201, 202, 203, and 205

NAME	FUNCTION
LED201	Scanning motor at correct speed.
SW201	“Right” paper tray size switch.
SW202	“Middle” paper tray size switch.
SW203	“Left” paper tray size switch.
SW205	Bottom cover is installed (Thermistor Bypass Switch).

Table 7-53. Signal Listing

Pin No.	Color	Name	Description
Connector J201			
J201	Varies	BD	Beam Detect indicates the beginning of a raster scan line.
Connector J202			
J202-01	Red	DSADJ	Photodiode sensitivity adjustment bias.
J202-02	White	PD	Photodiode feedback signal to indicate laser beam power.
J202-03	Red	LDRV	Laser diode current source, modulated by the video signal from the Interface/Formatter PCA.
J202-04	White	+5 Vdc	
J202-05	Green	FG	Frame Ground.
Connector J203			
J203-01	Red	FG–	Scanner motor tachometer feedback.
J203-02	Green	GND(FG)	
J203-03	White	FG+	Scanner motor tachometer feedback.
J203-04	Green	GND(FG)	
J203-05	Yellow	SCNCONT	Scanner motor speed control; signal level varies to maintain proper motor speed.
J203-06	Red	GND	
J203-07	White	+24VA	+24A Vdc

Table 7-53. Signal Listing (continued)

Pin No.	Color	Name	Description
Connector J205			
J205-A1	n/a	SG	Signal Ground.
J205-A2	n/a	$\overline{\text{PPRDY}}$	Printer Power Ready.
J205-A3	n/a	$\overline{\text{VSREQ}}$	Vertical Sync Request.
J205-A4	n/a	$\overline{\text{STATS}}$	DC Controller status.
J205-A5	n/a	$\overline{\text{CBSY}}$	I/F PCA sending command to DC Controller.
J205-A6	n/a	$\overline{\text{VSYNC}}$	Vertical sync pulse.
J205-A7	n/a	$\overline{\text{VDO}}$	Video data from I/F PCA.
J205-A8	n/a	$\overline{\text{CCLK}}$	Command strobe from I/F PCA.
J205-A9	n/a	-5V	-5Vdc
J205-A10	n/a		Not used.
J205-B1	n/a	$\overline{\text{BD}}$	Beam Detect–Horizontal sync pulse.
J205-B2	n/a	$\overline{\text{RDY}}$	Printer ready.
J205-B3	n/a	$\overline{\text{SBSY}}$	DC Controller sending status to I/F PCA.
J205-B4	n/a	$\overline{\text{PCLK}}$	Status strobe from DC Controller PCA.
J205-B5	n/a	$\overline{\text{PRNT}}$	Initiates printing operation.
J205-B6	n/a	$\overline{\text{CPRDY}}$	I/F PCA Power Ready.
J205-B7	n/a	$\overline{\text{CMND}}$	I/F PCA Command.
J205-B8	n/a		Not used.
J205-B9	n/a	+24VA	+24A Vdc
J205-10	n/a	FG	Frame Ground
Interface/Formatter PCA Voltage Connectors			
TB201	n/a	+5V	+5 Vdc
TB202	n/a	GND	

Table 7-53. Signal Listing (continued)

Pin No.	Color	Name	Description
Connector J206			
J206-01	Red	+24V	+24A Vdc.
J206-02	Blue	GND 24V	Return for +24A Vdc.
J206-03	Yellow	PEXP	Preconditioning Erase Lamps signal enables the Erase Lamps.
J206-04	Pink	FSRTH	Fuser Thermistor resistance provides a representative Fuser temperature signal to the DC Controller.
J206-05	Blue	GND	
J206-06	Lt. Blue	$\overline{\text{PDP}}$	Paper Delivery (Paper Exit) signal indicates that paper is present in the Fuser Assembly (PS331).
J206-07	Brown	+5V	+5 Vdc.
Connector J207			
J207-01	Red	+24VA	Lower Cooling Fan drive voltage. (+24 Vdc)
J207-02	White	GND	
Connector J208			
J208-01	Lt. Blue	FAN	Enables the Upper Cooling Fan during printing.
J208-02	Pink	$\overline{\text{FSRD}}$	Fusing Roller Heater Drive pulse enables the Fuser Bulb. Signal may only be observed with an oscilloscope.
J208-03	Blue	GND	
J208-04	Red	+24VA	+24A Vdc
Connector J209			
J209-01	Varies	FG	Frame Ground (Note: Jumper always installed.)
J209-02	Varies	SG	Signal Ground

Table 7-53. Signal Listing (continued)

Pin No.	Color	Name	Description
Connector J210 (Test Connector)			
J210-01	n/a	+24VA	+24VA Vdc
J210-02	n/a	$\overline{\text{TMODEO}}$	Test Mode Control Line 0.
J210-03	n/a	$\overline{\text{TMODEI}}$	Test Mode Control Line 1
J210-04	n/a	$\overline{\text{DBDC}}$	DC voltage added to developing bias when Low.
J210-05	n/a	-5V	-5 Vdc
J210-06	n/a	$\overline{\text{DBAC}}$	AC voltage added to developing bias when Low.
J210-07	n/a	GND	
J210-08	n/a	$\overline{\text{HVION}}$	High-Voltage (DC) applied to Primary Corona when Low.
J210-09	n/a	+5V	+5Vdc
J210-10	n/a	$\overline{\text{HVTON}}$	High voltage (DC) applied to Transfer Corona when Low.
J210-11	n/a	+3.2V	+3.2Vdc
J210-12	n/a	$\overline{\text{TPA}}$	Selects a test pattern to be printed with TPB and TSTPTE.
J210-13	n/a	$\overline{\text{TSTPT}}$	Low when the TEST PRINT switch is pressed.
J210-14	n/a	$\overline{\text{TPB}}$	See TPA.
J210-15	n/a	$\overline{\text{RDYINH}}$	Printer forced ready when Low.
J210-16	n/a	$\overline{\text{TSTPTE}}$	See TPA.
J210-17	n/a	$\overline{\text{LPCK}}$	Laser forced to operate at a power level selected by CSNT1 & CSNT2 when Low.
J210-18	n/a	$\overline{\text{CSNT1}}$	Laser power selected with CSNT2.
J210-19	n/a	$\overline{\text{SCNON}}$	Scanner motor starts when L.
J210-20	n/a	$\overline{\text{CSNT2}}$	See CSNT1.

Table 7-53. Signal Listing (continued)

Pin No.	Color	Name	Description
Connector J211			
J211-01	Lt. Blue	HVTON	Enables the Transfer Corona circuitry (+18 Vdc disabled, 0 Vdc enabled).
J211-02	Pink	HVRST	High-voltage reset.
J211-03	Gray	HV1ON	Enables the Primary Corona circuitry (+18 Vdc disabled, 0 Vdc enabled).
J211-04	Violet	DBAC	Enables the developer ac bias circuitry (+18 Vdc disabled, 0 Vdc enabled).
J211-05	Yellow	TSENS	Toner Sensor level provides a voltage level to the DC Controller representative of the amount of toner present in the EP-S Cartridge.
J211-06	Orange	DBDC	Enables the developer dc bias circuitry (+18 Vdc disabled, 0 Vdc enabled).
J211-07	Blue	GND	
J211-08	Red	+24 Vdc	
Connector J212			
J212-01	Blue	GND	
J212-02	Blue	GND	
J212-03	Brown	+5V	+5 Vdc
J212-04	Brown	+5V	+5 Vdc
J212-05	Gray	-5V	-5 Vdc
J212-06	Violet	RESET	Initializes the microprocessors on the DC Controller PCA.
J212-07	Lt. Blue	REMOTE	Enables the +24 Vdc power supplies on the DC Power Supply/Main Motor Driver PCA. Signal may only be observed with an oscilloscope.
J212-08	Pink	A	Main Motor Drive signal.
J212-09	Orange	\bar{A}	Main Motor Drive signal.
J212-10	Yellow	B	Main Motor Drive signal.
J212-11	White	\bar{B}	Main Motor Drive signal.
J212-12	Blue	GND	
J212-13	Pink	+24VB	+24B Vdc
J212-14	Red	+24VA	+24A Vdc

Table 7-53. Signal Listing (continued)

Pin No.	Color	Name	Description
Connector J213			
J213-01	Orange	$\overline{\text{CSENS1}}$	EP-S Cartridge Sensitivity switches indicate the sensitivity and the presence of the EP-S Cartridge.
J213-02	Pink	$\overline{\text{CSENS2}}$	EP-S Cartridge Sensitivity switches indicate the sensitivity and the presence of the EP-S Cartridge.
J213-03	Violet	REGD	Registration Drive signal enables the Registration Solenoid (SL302) to advance paper through the Registration Rollers.
J213-04	Lt. Blue	CPUD	Control Pickup enables the Paper Pickup Solenoid (SL301).
J213-05	Red	+24V	+24A Vdc
J213-06	Blue	GND	
J213-07	Brown	+5V	+5 Vdc
J213-08	White	$\overline{\text{PEMP}}$	Paper Out indicates the absence of paper in the paper tray. Signal is low when paper is not detected (PS301).
J213-09	Yellow	$\overline{\text{MPFS}}$	Manual Paper Feed Sensor signal indicates the presence of paper in the manual area of printer (PS302).

Signal Timing Chart, HP 33440 and HP 33449

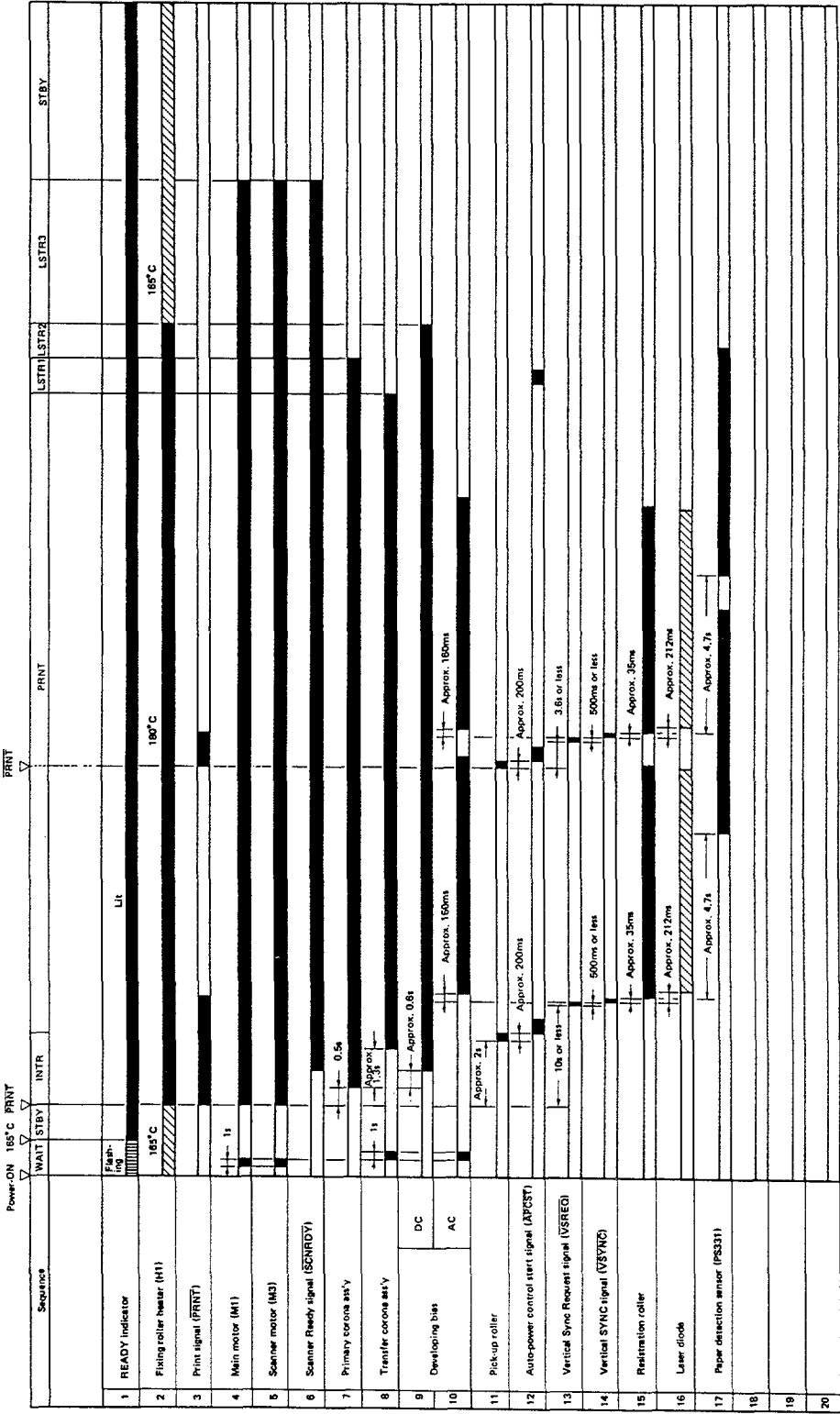


Figure 7-41. HP 33440/HP 33449 Signal Timing Chart

PARTS AND DIAGRAMS

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8-1. HOW TO USE THE PARTS LISTS




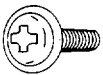

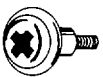

The figures in this chapter illustrate the major subassemblies and their component parts of the HP 33440 and HP 33449 printers. Each figure is followed by a table which lists the item number for each part given in the illustration, the associated part number for the item, the quantity required, any special notes, and the description of that part. While looking for a part number, pay special attention to the voltage listed in the description column to ensure that the part number is for the correct type of machine.

Part numbers with no indicator in the *Notes* column are stocked and can be ordered through Hewlett-Packard's Support Material Organization (SMO). Parts marked with an "S" in the *Notes* column are special order parts which can be "hotlined" through SMO but have an eight-week lead time. Parts that have no reference designator or part number are not field-replaceable and cannot be ordered through SMO.

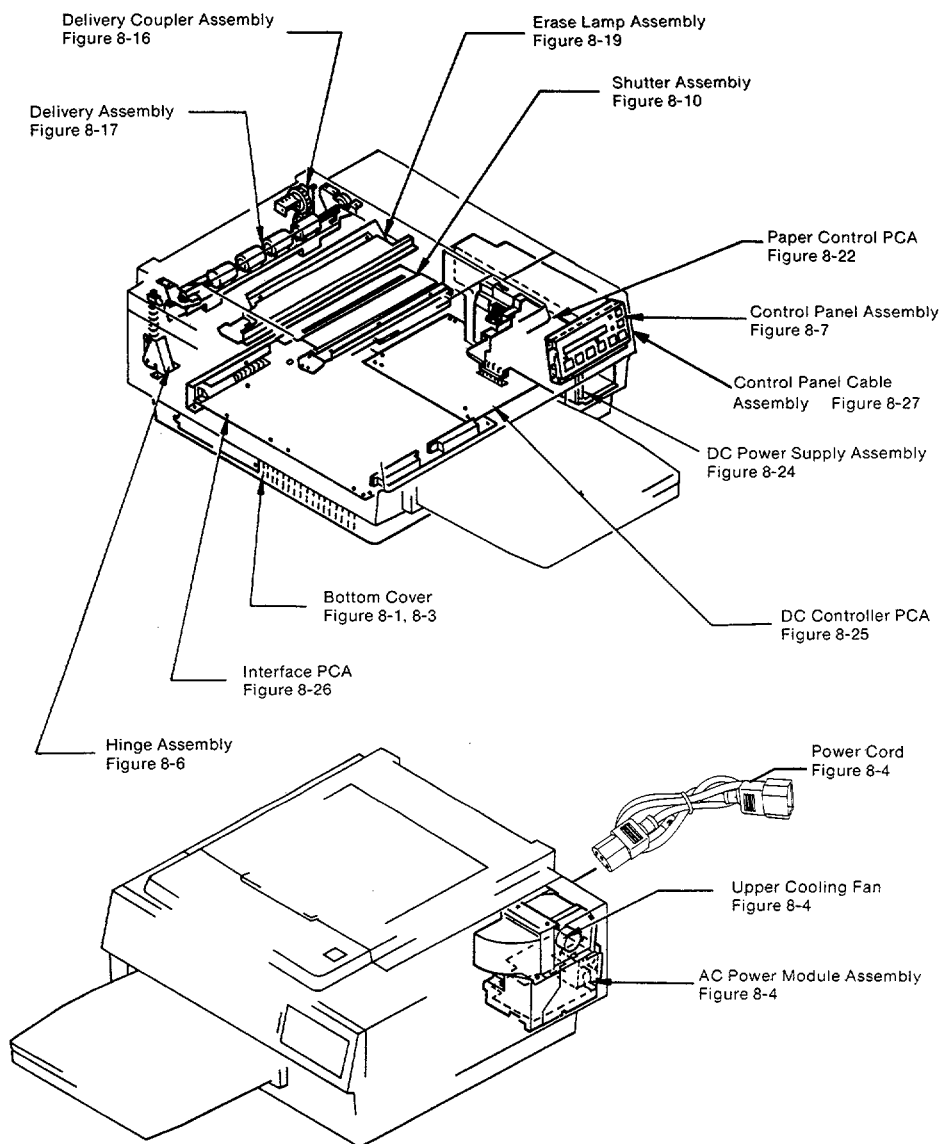
An alphabetical index referencing all part numbers is included at the end of the chapter (Section 8-3).

The following table identifies common hardware used in the HP 33440 and HP 33449 printers:

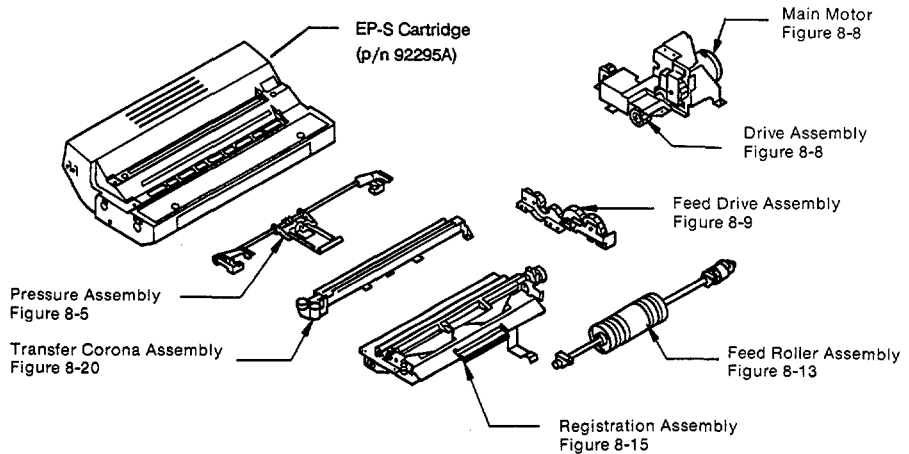
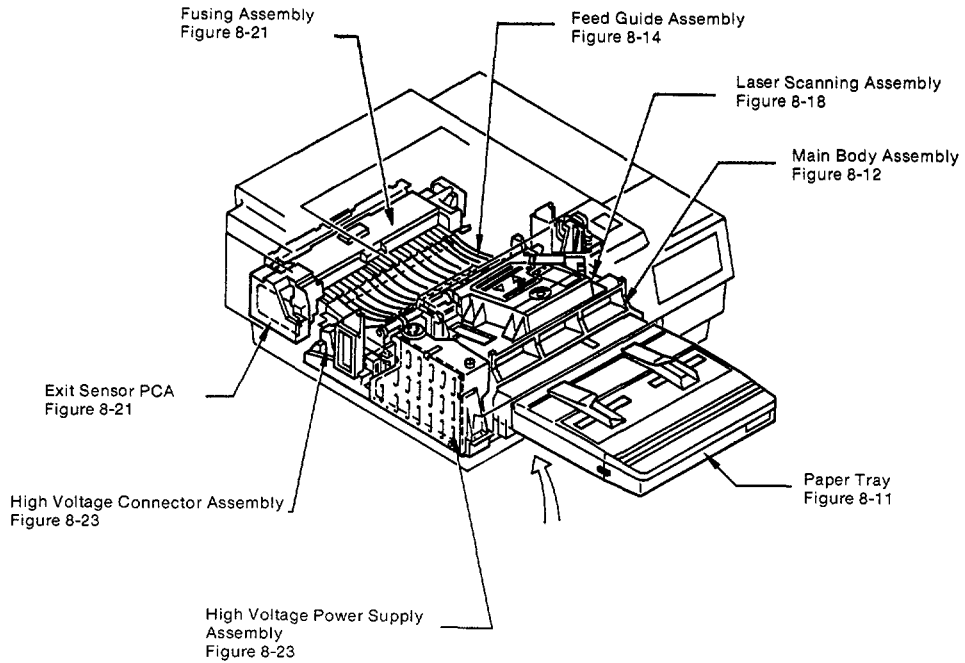
Table 8-0. Table 8-0. COMMON HARDWARE

EXAMPLE	DESCRIPTION	PART NUMBER
	Coated (black) pan-head Phillips machine screw.	Use plated screws. (See below)
	Plated (silver-colored) pan-head Phillips machine screw.	M3x6 - 0515-1896 M3x8 - 0515-1895 M4x6 - 0515-1876 M4x8 - 0515-1912
	Coated (black) washer-head Phillips machine screw.	M3x6 - XB6-7300-609CN M3x8 - XB6-7300-809CN
	Plated (silver-colored) washer-head Phillips machine screw.	M3x6 - XA9-0267-000CN
	Coated (black) self-tapping Phillips screw for plastic.	M3x6 - XB4-7300-609CN M4x10 - XB4-7401-009CN
	Plated (brass-colored) Phillips shoulder screw.	XA9-0342-000CN
	Plated (silver-colored) Phillips screw with captive star washer.	XA9-0389-000CN

8-2. PARTS LIST



Main Assemblies (1 of 2)



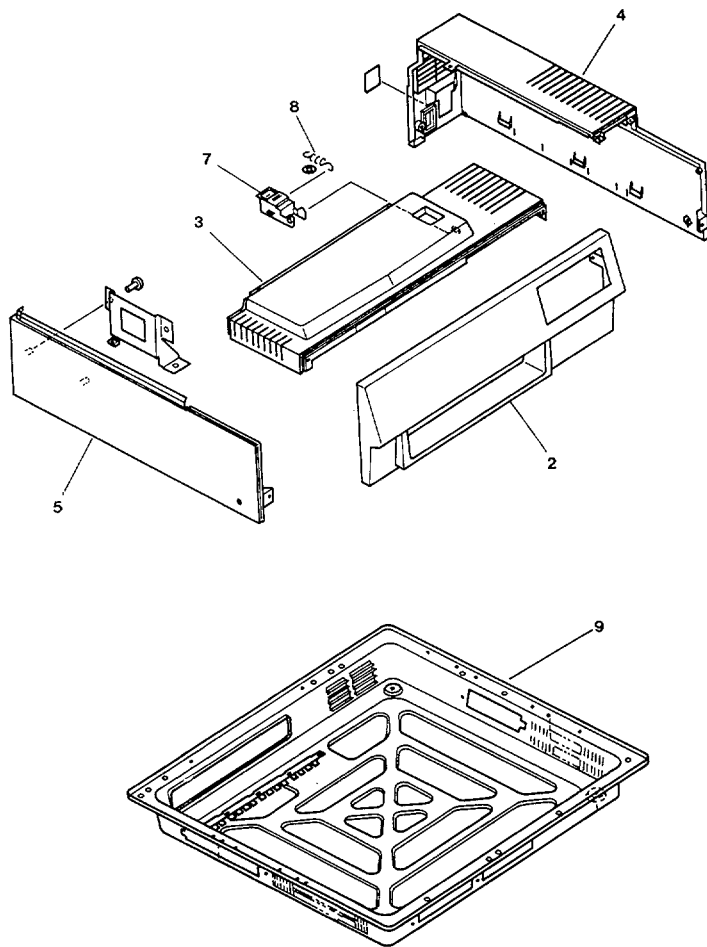


Figure 8-1A. External Covers - HP 33440

Table 8-1A. EXTERNAL COVERS - HP 33440

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
2	RA1-4231-000CN	1		PANEL, FRONT LOWER
3	RA1-4232-000CN	1		PANEL, FRONT UPPER
4	RA1-4233-020CN	1	S	PANEL, RIGHT <i>RF1-2037-000 CN</i>
5	RA1-4234-000CN	1		PANEL, LEFT
7	RA1-4235-000CN	1		RELEASE BUTTON
8	RS1-2149-000CN	1		SPRING, TENSION
9	RF1-0975-000CN	1		COVER, BOTTOM

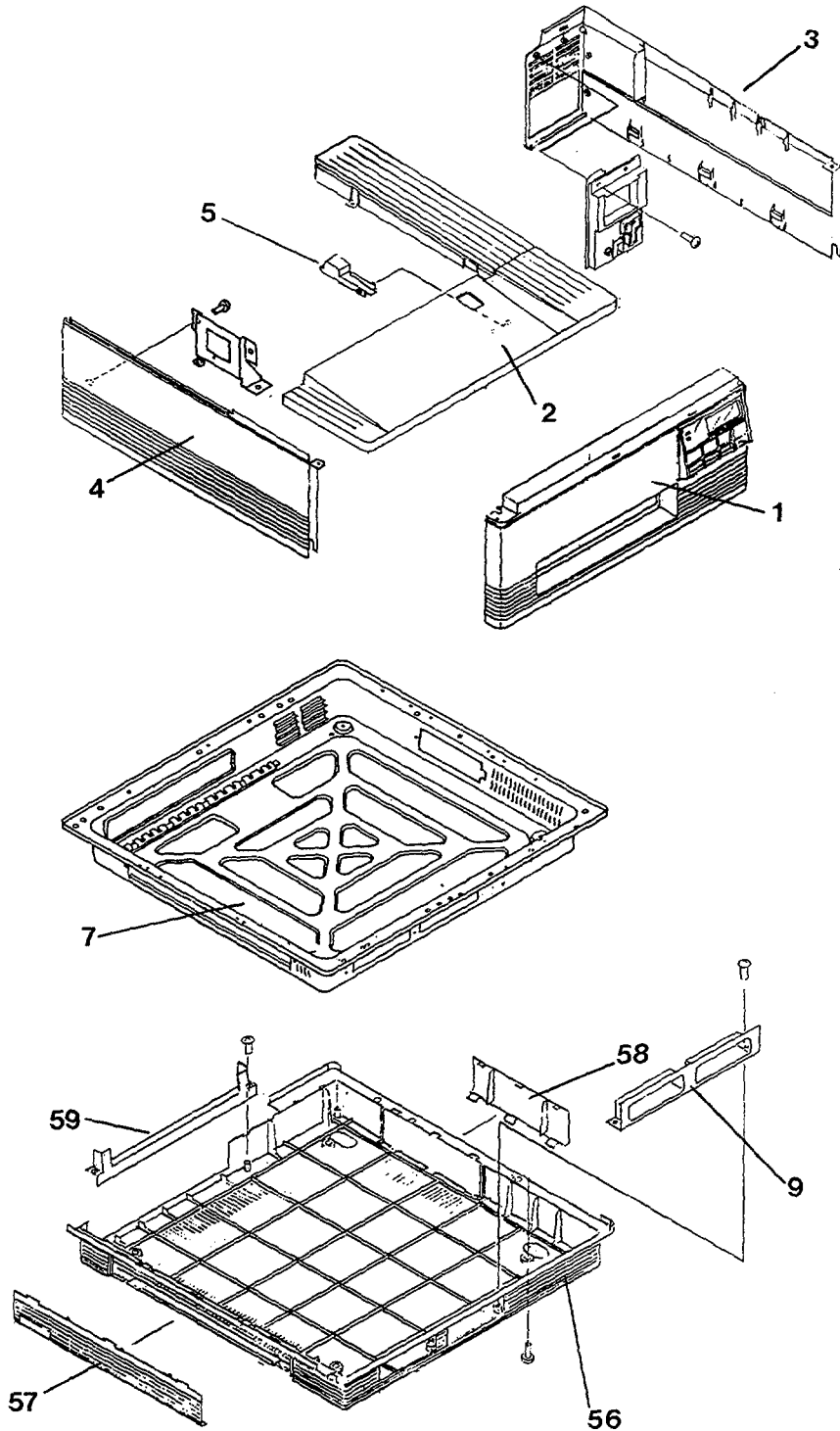


Figure 8-1B. External Covers - HP 33449

Table 8-1B. EXTERNAL COVERS - HP 33449

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RF1-2572-000CN	1		PANEL, FRONT
2	RF1-2574-000CN	1		PANEL, TOP
3	RF1-2575-000CN	1		PANEL, RIGHT
4	RF1-2576-000CN	1		PANEL, LEFT
5	RA1-8278-000CN	1		RELEASE BUTTON
7	RF1-2577-000CN	1		COVER, BOTTOM
9	RA1-8290-000CN	1		GUIDE, FONT CARTRIDGE
56	RA1-8273-000CN	1		PANEL, BOTTOM COVER
57	RA1-8284-000CN	1		PANEL, MEMORY COVER
58	RA1-8285-000CN	1		PANEL, TEST COVER
59	RA1-8293-000CN	1		GUARD, I/O CONNECTOR

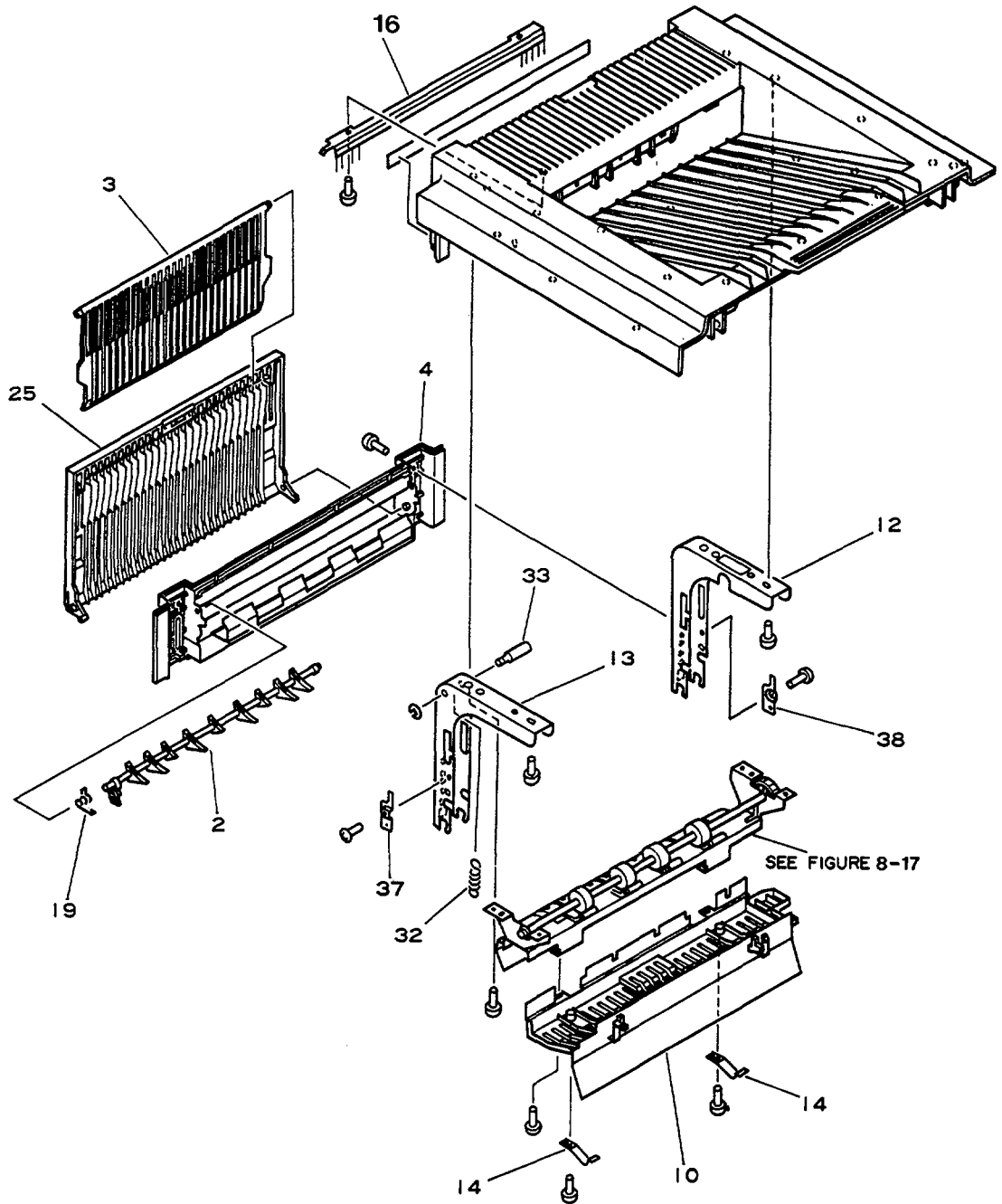


Figure 8-2A. Upper Main Body - HP 33440 (1 of 2)

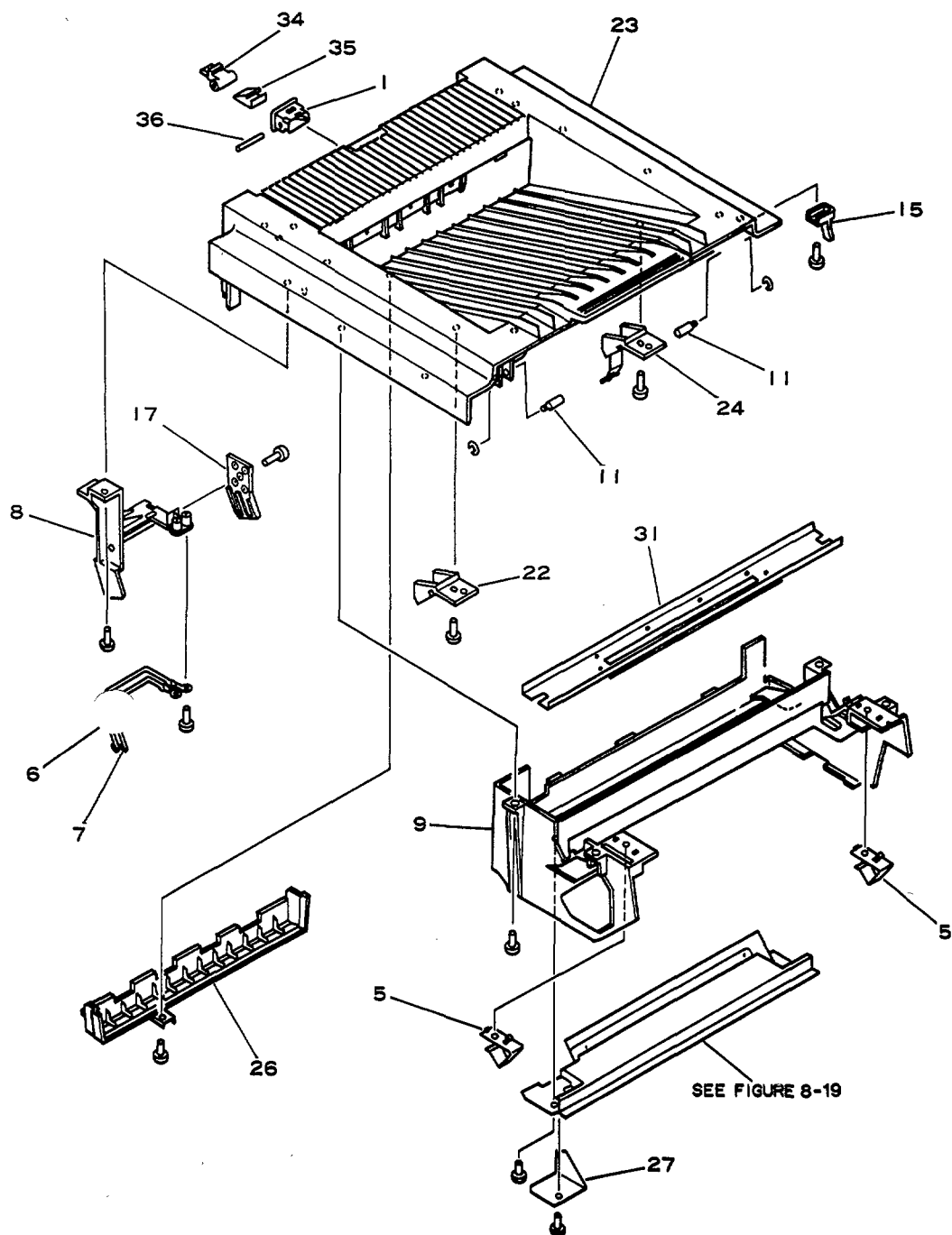


Figure 8-2A. Upper Main Body - HP 33440 (2 of 2)

Table 8-2A. UPPER MAIN BODY - HP 33440

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RA1-4019-000CN	1		HOLDER, MAGNET
2	RA1-4021-000CN	1		DEFLECTOR PAWL ASSEMBLY
3	RA1-4290-000CN	1		TRAY, UPPER REAR OUTPUT
4	RA1-4292-000CN	1		PANEL, REAR DELIVERY
5	RA1-4025-000CN	2	S	SPRING, LEAF
6	RA1-4034-000CN	1		SPRING A, GROUNDING
7	RA1-4035-000CN	1		SPRING B, GROUNDING
8	RA1-4036-000CN	1		ARM, CONNECTOR
9	RF1-0947-000CN	1		GUIDE, EP-S CARTRIDGE
10	RA1-4038-000CN	1		COVER, FUSER INSULATING
11	RA1-4042-000CN	2	S	SHAFT, LOCK
12	RA1-4030-000CN	1		PLATE, RIGHT HINGE BRACKET
13	RA1-4033-000CN	1		PLATE, LEFT HINGE BRACKET
14	RA1-4045-020CN	2	S	SPRING, LEAF
15	RA1-4046-000CN	1		LEVER, INTERLOCK
16	RA1-4047-000CN	1		ELIMINATOR, STATIC CHARGE
17	RA1-4048-000CN	1		COVER, CONNECTOR ARM
19	RS1-2101-000CN	1		SPRING, TORSION
22	RF1-0926-000CN	1	S	SPRING, RIGHT, MIRROR
23	RF1-0977-000CN	1		PANEL, TOP COVER ASSEMBLY
24	RF1-0929-000CN	1	S	SPRING, LEFT, MIRROR
25	RF1-0985-000CN	1		TRAY, LOWER REAR OUTPUT
26	RA1-4294-000CN	1		COVER, LOWER DELIVERY
27	RA1-4079-000CN	1	S	COVER, LAMP ASSEMBLY
31	RG0-0052-000CN	1		MIRROR ASSEMBLY
32	RS1-2152-000CN	1		SPRING, TENSION
33	RA1-5258-000CN	1	S	SHAFT, SPRING
34	RA1-5361-000CN	1		LATCH
35	RA1-5362-000CN	1		SPRING, LEAF
36	RA1-5363-000CN	1		SHAFT, LATCH
37	RA1-5256-000CN	1	S	PLATE, LEFT LOCK
38	RA1-5257-000CN	1	S	PLATE, RIGHT LOCK

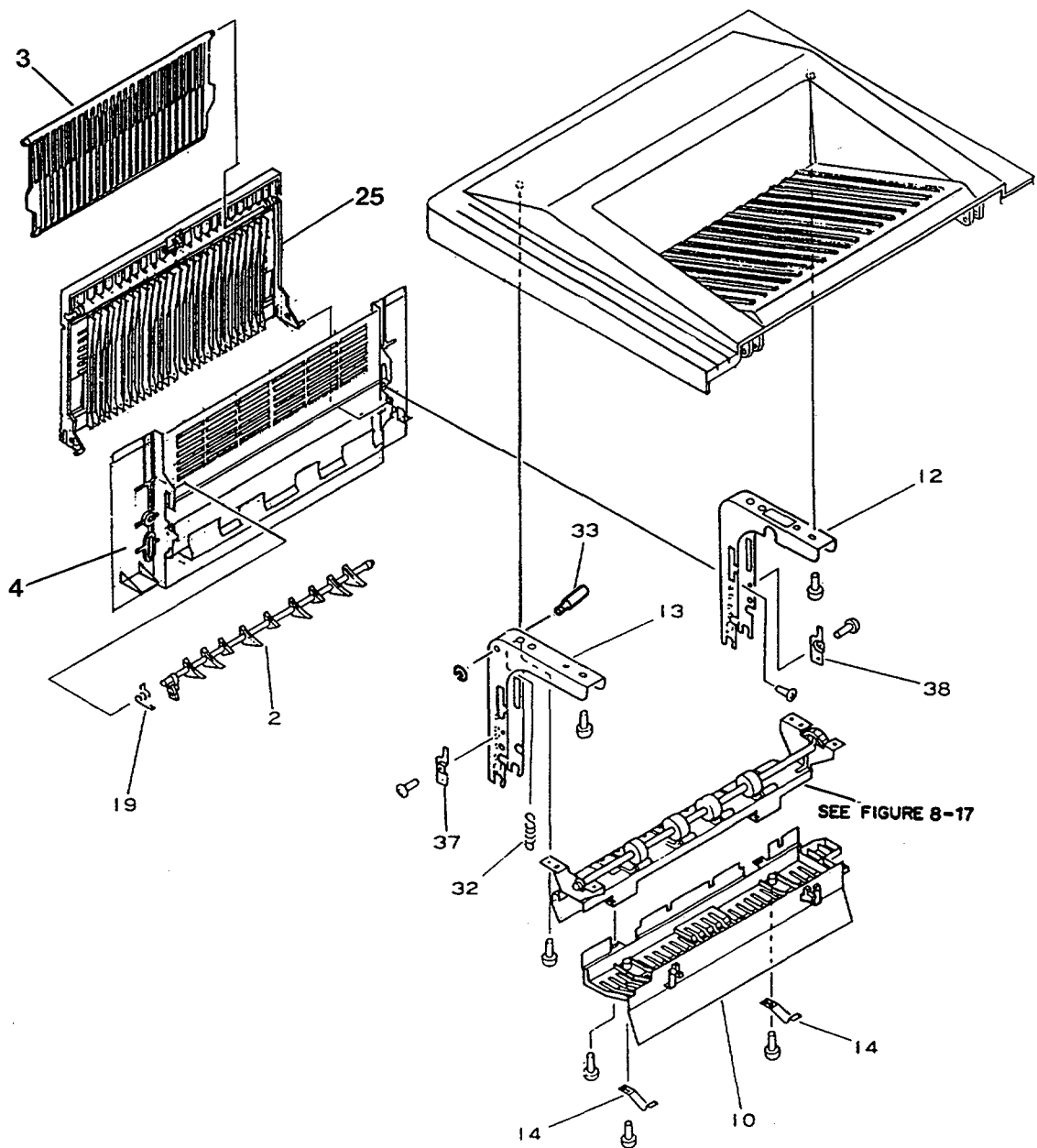


Figure 8-2B. Upper Main Body - HP 33449 (1 of 2)

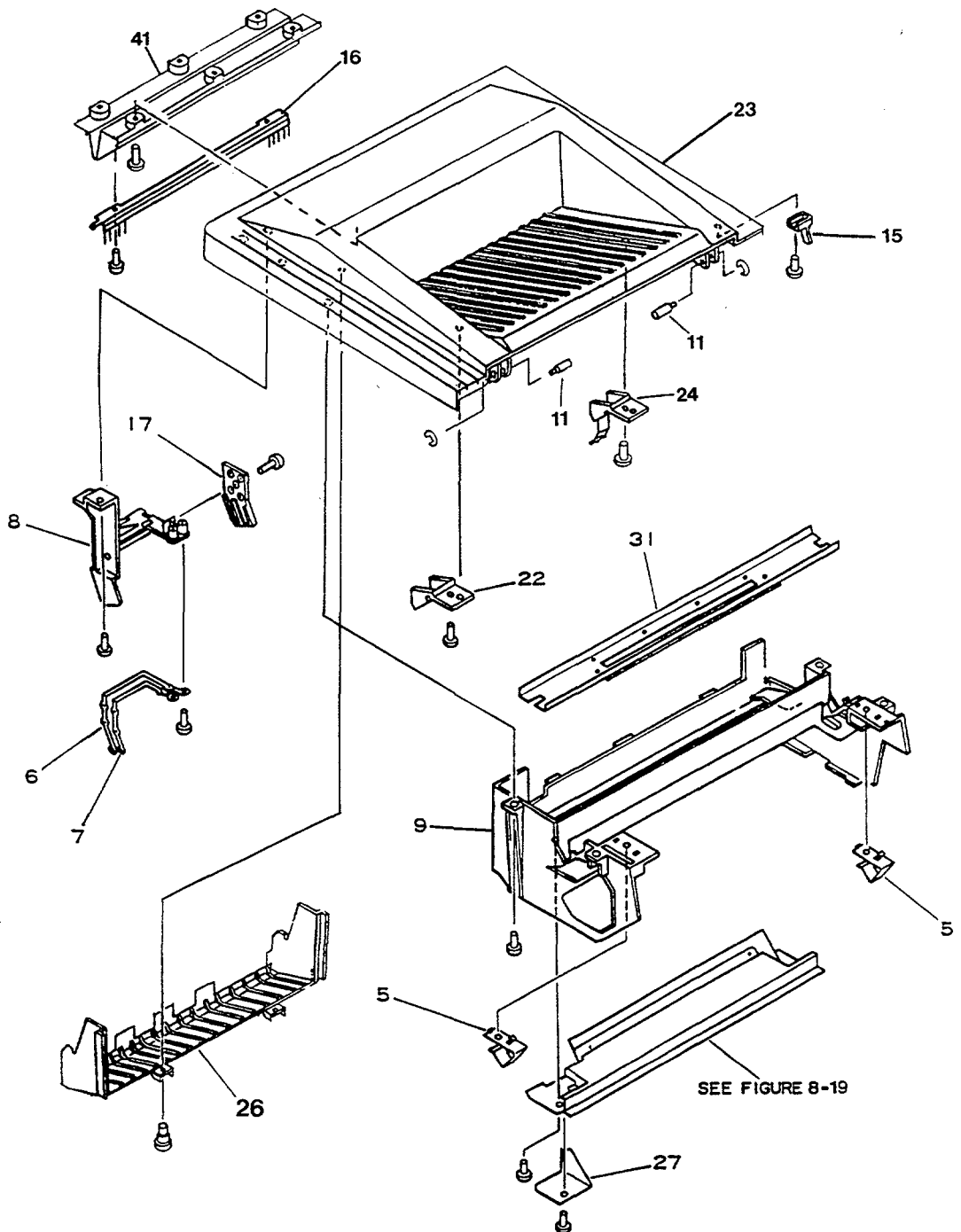


Figure 8-2B. Upper Main Body - HP 33449 (2 of 2)

Table 8-2B. UPPER MAIN BODY - HP 33449

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
2	RA1-4021-000CN	1		DEFLECTOR PAWL ASSEMBLY
3	RA1-4290-000CN	1		TRAY, UPPER REAR OUTPUT
4	RA1-8275-000CN	1		PANEL, REAR DELIVERY
5	RA1-4025-000CN	2	S	SPRING, LEAF
6	RA1-4034-000CN	1		SPRING A, GROUNDING
7	RA1-4035-000CN	1		SPRING B, GROUNDING
8	RA1-4036-000CN	1		ARM, CONNECTOR
9	RF1-0947-000CN	1		GUIDE, EP-S CARTRIDGE
10	RA1-4038-000CN	1		COVER, FUSER INSULATING
11	RA1-4042-000CN	2	S	SHAFT, LOCK
12	RA1-4030-000CN	1		PLATE, RIGHT HINGE BRACKET
13	RA1-4033-000CN	1		PLATE, LEFT HINGE BRACKET
14	RA1-4045-020CN	2	S	SPRING, LEAF
15	RA1-4046-000CN	1		LEVER, INTERLOCK
16	RA1-4047-000CN	1		ELIMINATOR, STATIC CHARGE
17	RA1-4048-000CN	1		COVER, CONNECTOR ARM
19	RS1-2101-000CN	1		SPRING, TORSION
22	RF1-0926-000CN	1	S	SPRING, RIGHT, MIRROR
23	RF1-2579-000CN	1		PANEL, TOP COVER ASSEMBLY
24	RF1-0929-000CN	1	S	SPRING, LEFT, MIRROR
25	RF1-2580-000CN	1		TRAY, LOWER REAR OUTPUT
26	RA1-8287-000CN	1		COVER, LOWER DELIVERY
27	RA1-4079-000CN	1	S	COVER, LAMP ASSEMBLY
31	RG0-0052-000CN	1		MIRROR ASSEMBLY
32	RS1-2152-000CN	1		SPRING, TENSION
33	RA1-5258-000CN	1	S	SHAFT, SPRING
37	RA1-5256-000CN	1	S	PLATE, LEFT LOCK
38	RA1-5257-000CN	1	S	PLATE, RIGHT LOCK
41	RA1-8276-000CN	1		COVER, UPPER DELIVERY

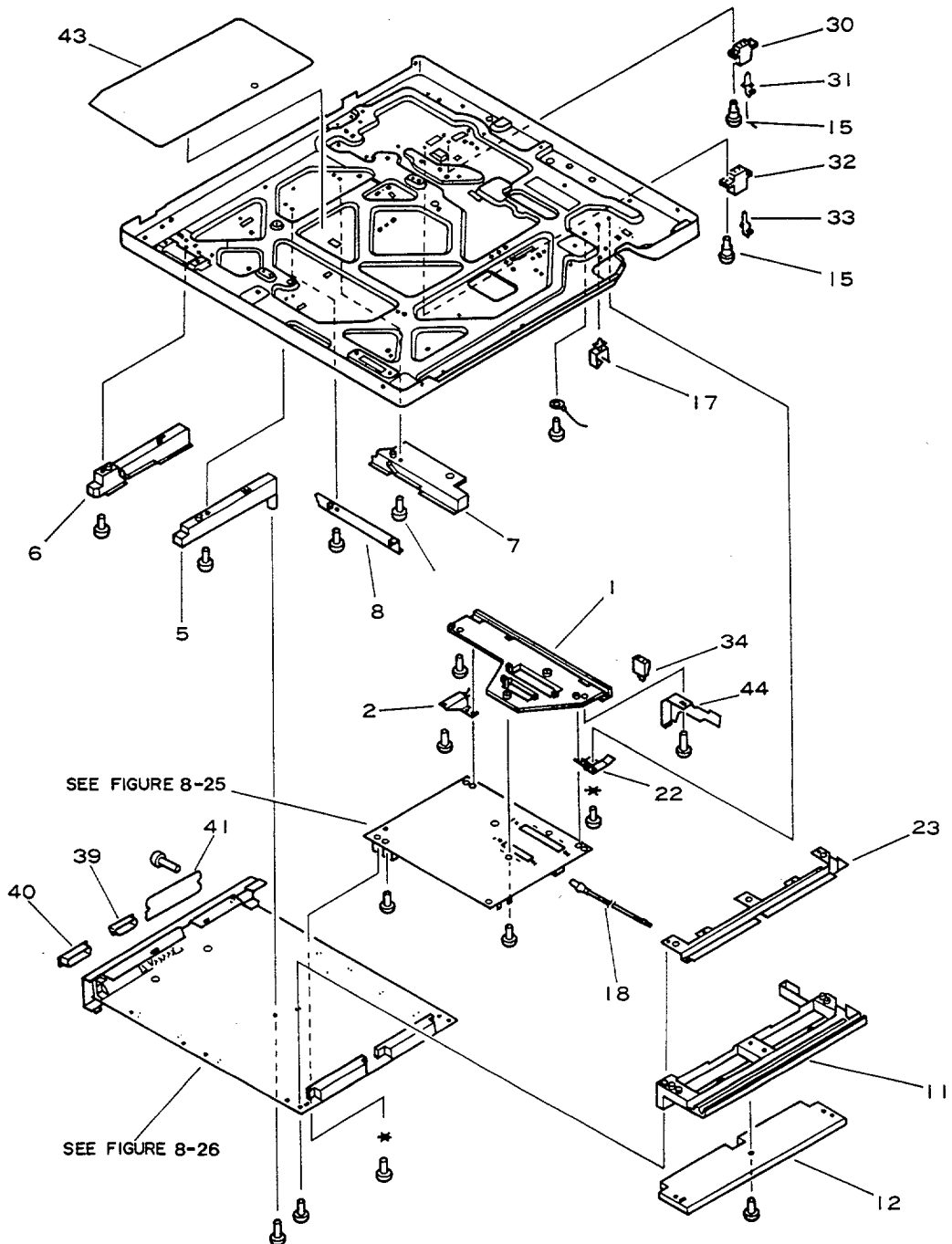


Figure 8-3A. Lower Main Body - HP 33440 (1 of 2)

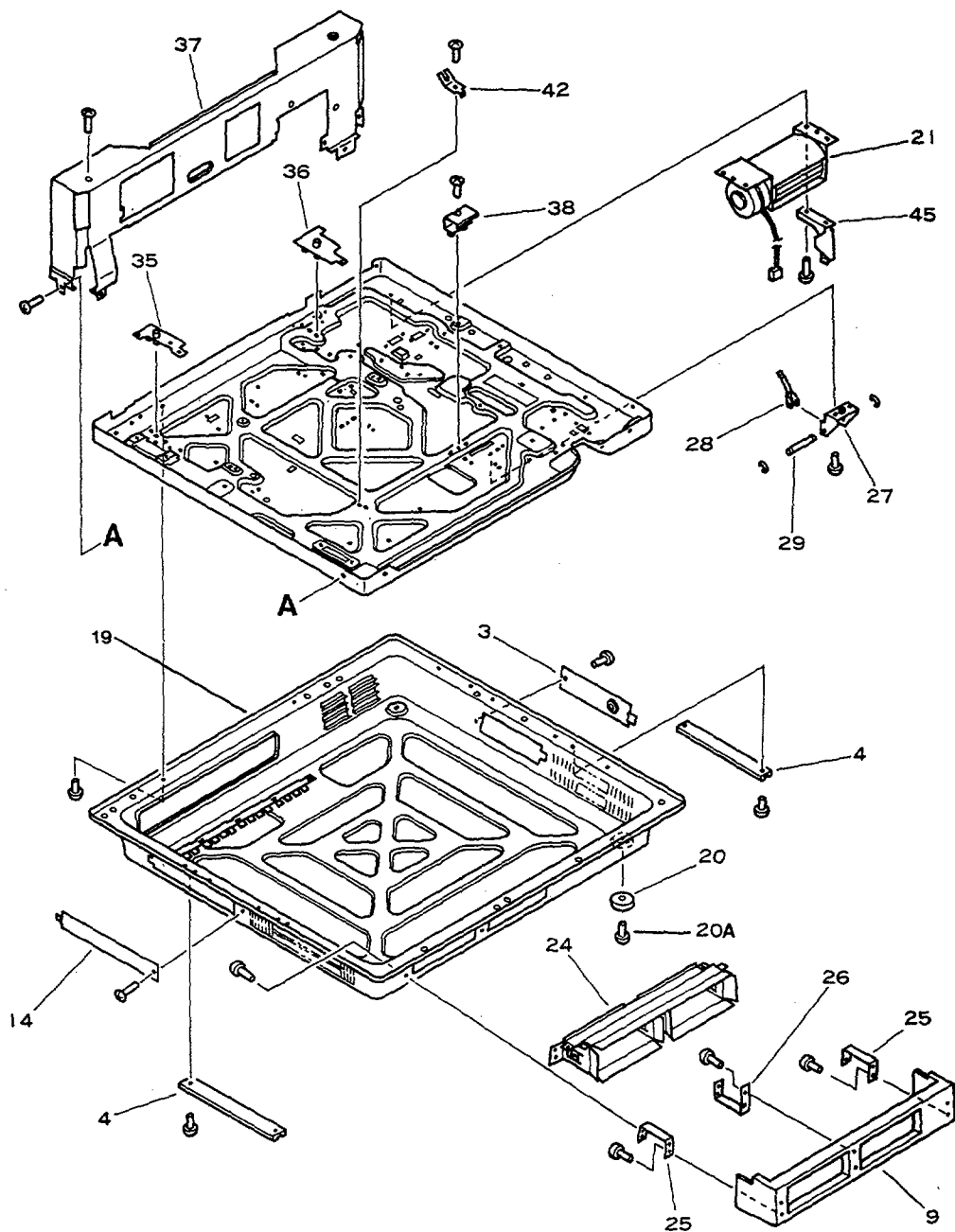


Figure 8-3A. Lower Main Body - HP 33440 (2 of 2)

Table 8-3A. LOWER MAIN BODY - HP 33440

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RA1-4114-000CN	1	S	PLATE, DC CONTROLLER MOUNTING
2	RA1-4115-050CN	1	S	TERMINAL
3	RA1-4282-000CN	1	S	PLATE, SERVICE COVER
4	RA1-4283-000CN	2		KNOB
5	RA1-4132-000CN	1	S	GUIDE, FRONT, D-RAM PCA
6	RA1-4133-000CN	1	S	GUIDE, REAR, D-RAM PCA
7	RA1-4134-000CN	1	S	GUIDE, RIGHT, EXPANSION PCA
8	RA1-4135-000CN	1	S	GUIDE, LEFT, EXPANSION PCA
9	RA1-4285-000CN	1		PANEL, FONT CARTRIDGE
11	RA1-4138-000CN	1		GUIDE, UPPER, CARTRIDGE
12	RA1-4139-000CN	1		GUIDE, LOWER, CARTRIDGE
14	RA1-4296-000CN	1		PLATE, D-RAM
15	XA9-0342-000CN	10		SCREW, STEPPED M3
17	WT2-0250-000CN	3	S	CLIP, CABLE
18	RH2-5053-000CN	1		FIBER OPTIC CABLE
19	RF1-0975-000CN	1		COVER, BOTTOM
20	RA1-4113-000CN	4		FOOT
20A	0515-0055	4		SCREW
21	RH7-1056-000CN	1		FAN, LOWER COOLING
22	RA1-4146-050CN	1	S	PLATE, TERMINAL
23	RA1-4147-000CN	1	S	SHIELD, DC PWR SUPPLY CABLE
24	RA1-4148-000CN	1		SHIELD, FONT CARTRIDGE
25	RA1-4149-000CN	2		SUPPORT, PANEL A
26	RA1-4150-000CN	1		SUPPORT, PANEL B
27	RA1-4161-000CN	1	S	MOUNT, TRAY SIZE SENSING
28	RA1-4162-000CN	3		LEVER, TRAY SIZE SENSING
29	RA1-4637-000CN	1		SHAFT, TRAY SIZE LEVER
30	VS3-0190-003CN	1	S	CONNECTOR, 3P FEMALE
31	WS3-0976-000CN	2	S	CONTACT
32	VS3-0190-004CN	1	S	CONNECTOR, 4P FEMALE
33	WS3-1204-000CN	4	S	CONTACT
34	RH2-5051-000CN	1		CONNECTOR
35	RA1-4167-000CN	1		INSULATOR, LEFT, FUSING ASS'Y
36	RA1-4168-000CN	1		INSULATOR, RIGHT, FUSING ASS'Y
37	RA1-4170-000CN	1		PLATE, FRONT SUPPORT
38	RA1-4638-000CN	1	S	COVER, LEVER
39	VS9-0013-025CN	1	S	CAP, SERIAL I/O DUST
40	WS9-0104-000CN	1	S	CAP, CENTRONICS I/O DUST
41	SA4-6202-000CN	1	S	PLATE, OPTIONAL I/O DUST
42	RA1-4317-000CN	1	S	SPRING, LEAF
43	RA1-5423-000CN	1	S	INSULATION SHEET
44	RA1-5489-000CN	1	S	PLATE
45	RA1-5490-000CN	1	S	STAND, FAN MOUNT

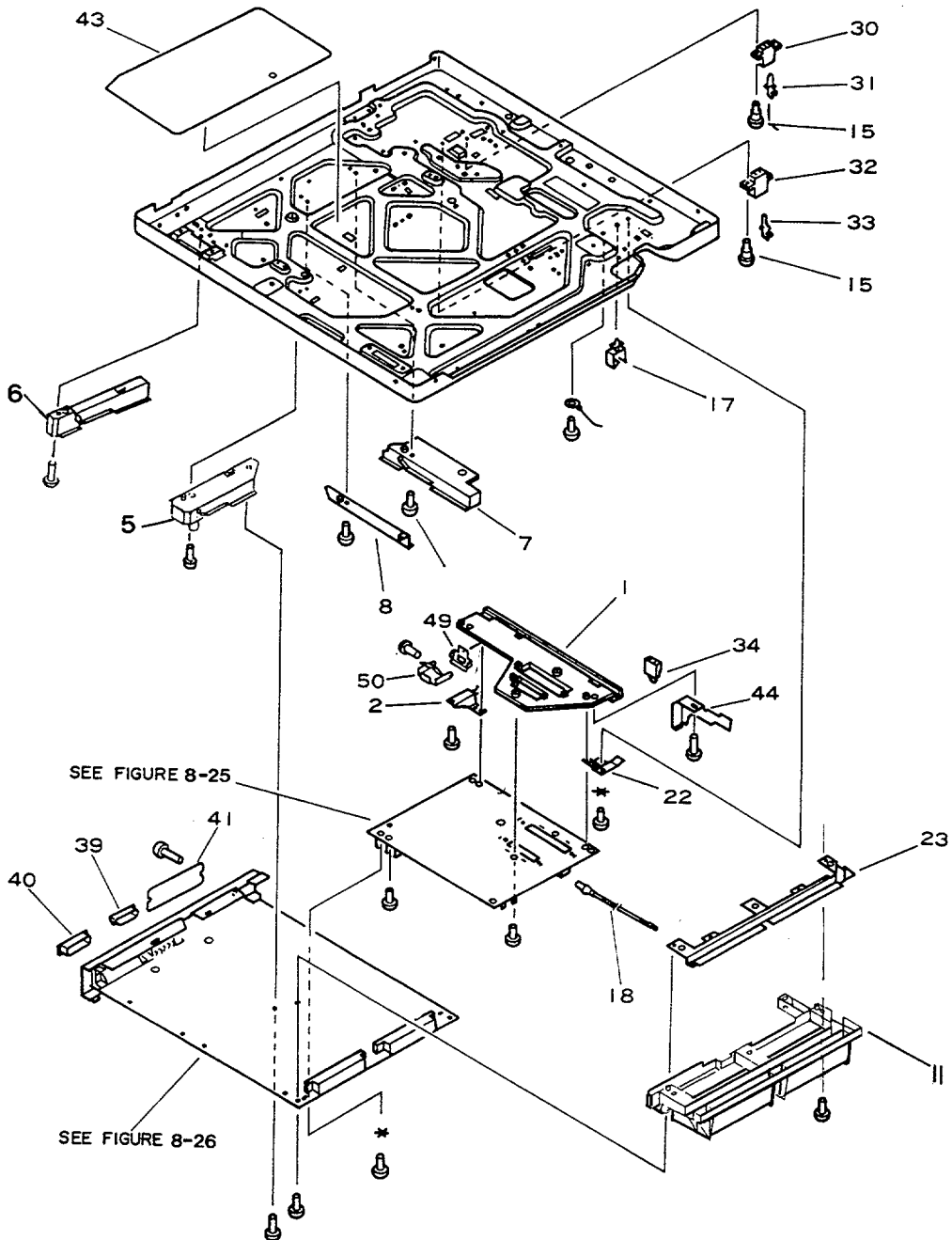


Figure 8-3B. Lower Main Body - HP 33449 (1 of 2)

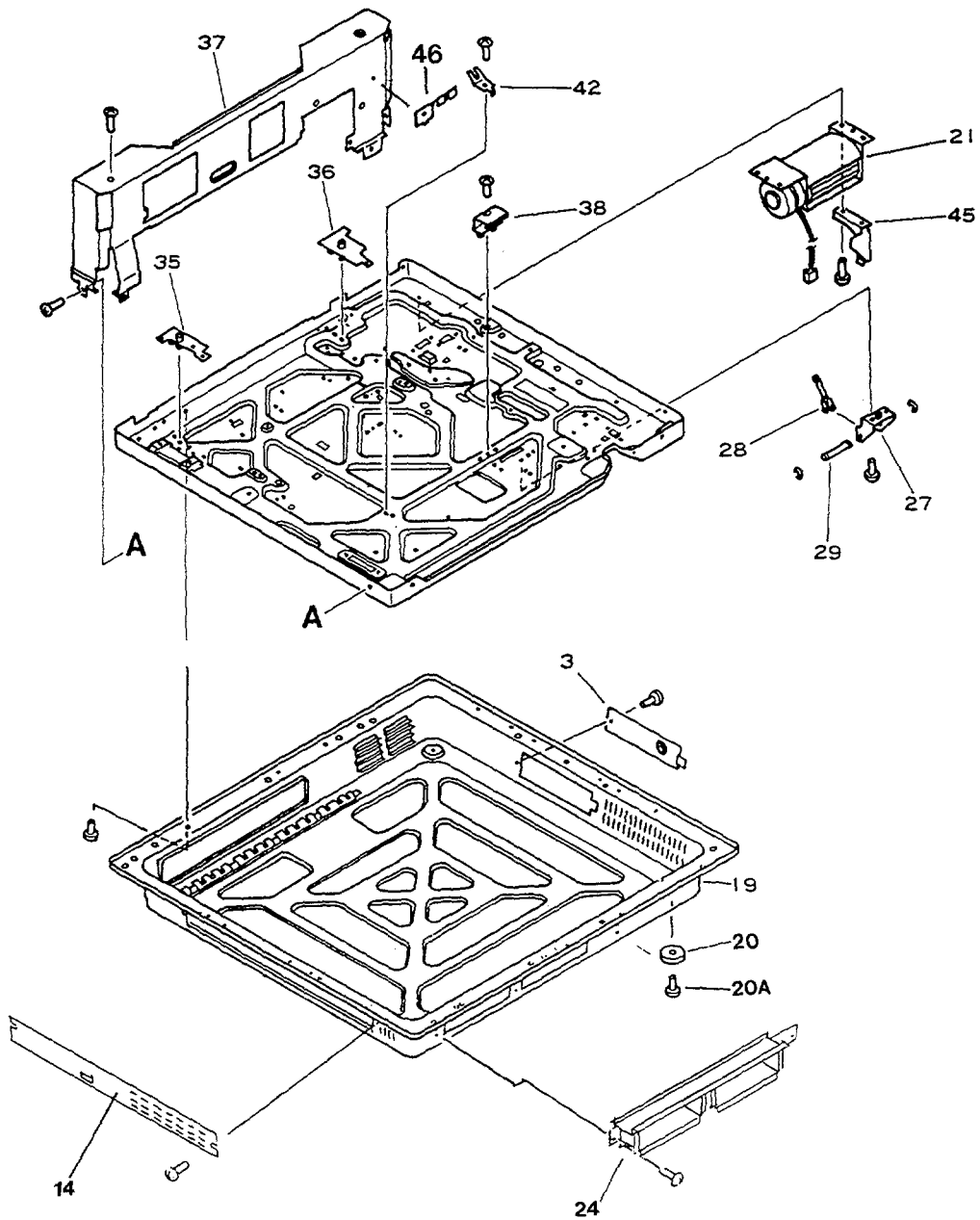


Figure 8-3B. Lower Main Body - HP 33449 (2 of 2)

Table 8-3B. LOWER MAIN BODY - HP 33449

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RA1-4114-000CN	1	S	PLATE, DC CONTROLLER MOUNTING
2	RA1-4115-050CN	1	S	TERMINAL
3	RA1-6047-000CN	1	S	PLATE, SERVICE COVER
5	RA1-8292-000CN	1	S	GUIDE, DRAM REAR
6	RA1-8289-000CN	1	S	GUIDE, DRAM CENTER
7	RA1-4134-000CN	1	S	GUIDE, RIGHT, EXPANSION PCA
8	RA1-4135-000CN	1	S	GUIDE, LEFT, EXPANSION PCA
11	RA1-8302-000CN	1		GUIDE, FONT CARTRIDGE
14	RA1-8299-000CN	1		PLATE, DRAM ACCESS
15	XA9-0342-000CN	10		SCREW, STEPPED M3
17	WT2-0250-000CN	3	S	CLIP, CABLE
18	RH2-5108-000CN	1		FIBER OPTIC CABLE
19	RF1-2577-000CN	1		COVER, BOTTOM
20	RA1-4113-000CN	4		FOOT
20A	0515-0055	4		SCREW
21	RH7-1056-000CN	1		FAN, LOWER COOLING
22	RA1-4146-050CN	1	S	PLATE, TERMINAL
23	RA1-4147-000CN	1	S	SHIELD, DC PWR SUPPLY CABLE
24	RA1-8295-000CN	1		SHIELD, FONT CARTRIDGE
27	RA1-4161-000CN	1	S	MOUNT, TRAY SIZE SENSING
28	RA1-4162-000CN	3		LEVER, TRAY SIZE SENSING
29	RA1-4637-000CN	1		SHAFT, TRAY SIZE LEVER
30	VS3-0190-003CN	1	S	CONNECTOR, 3P FEMALE
31	WS3-1204-000CN	2	S	CONTACT
32	VS3-0190-004CN	1	S	CONNECTOR, 4P FEMALE
33	WS3-1204-000CN	4	S	CONTACT
34	RH2-5051-000CN	1		CONNECTOR
35	RA1-4167-000CN	1		INSULATOR, LEFT, FUSING ASS'Y
36	RA1-4168-000CN	1		INSULATOR, RIGHT, FUSING ASS'Y
37	RA1-4170-000CN	1		PLATE, FRONT SUPPORT
38	RA1-4638-000CN	1	S	COVER, LEVER
39	VS9-0013-025CN	1	S	CAP, SERIAL I/O DUST
40	WS9-0104-000CN	1	S	CAP, CENTRONICS I/O DUST
41	SA4-6202-000CN	1	S	PLATE, OPTIONAL I/O DUST
42	RA1-4317-000CN	1	S	SPRING, LEAF
43	RA1-5423-000CN	1	S	INSULATION SHEET
44	RA1-5489-000CN	1	S	PLATE
45	RA1-5490-000CN	1	S	STAND, FAN MOUNT
46	RA1-8011-000CN	1	S	PLATE, GROUNDING
49	RA1-5403-000CN	1	S	MOUNT, SWITCH LEVER
50	RA1-5404-000CN	1	S	PLATE, LEVER

000 CN

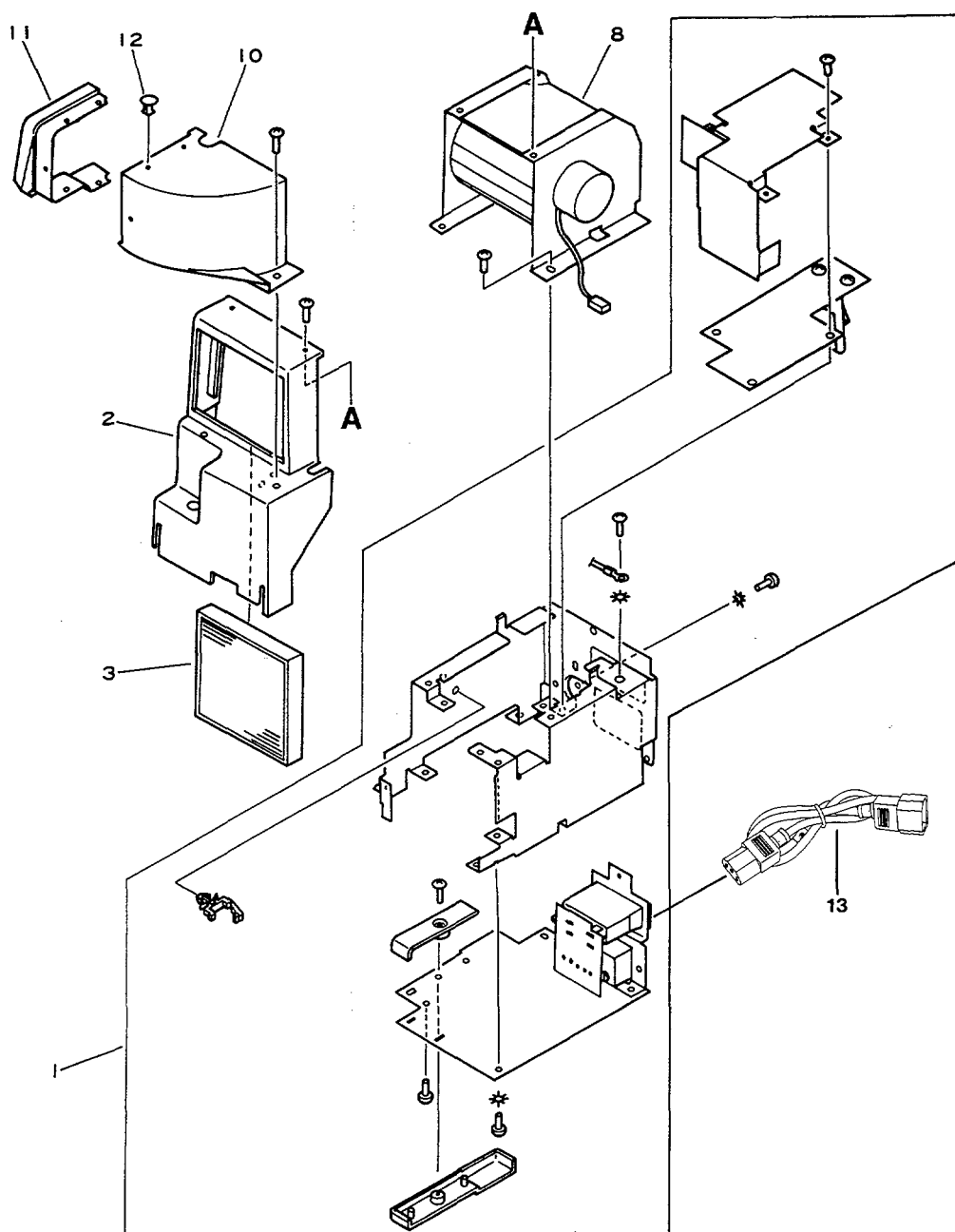


Figure 8-4A. AC Power Module and Upper Cooling Fan - HP 33440

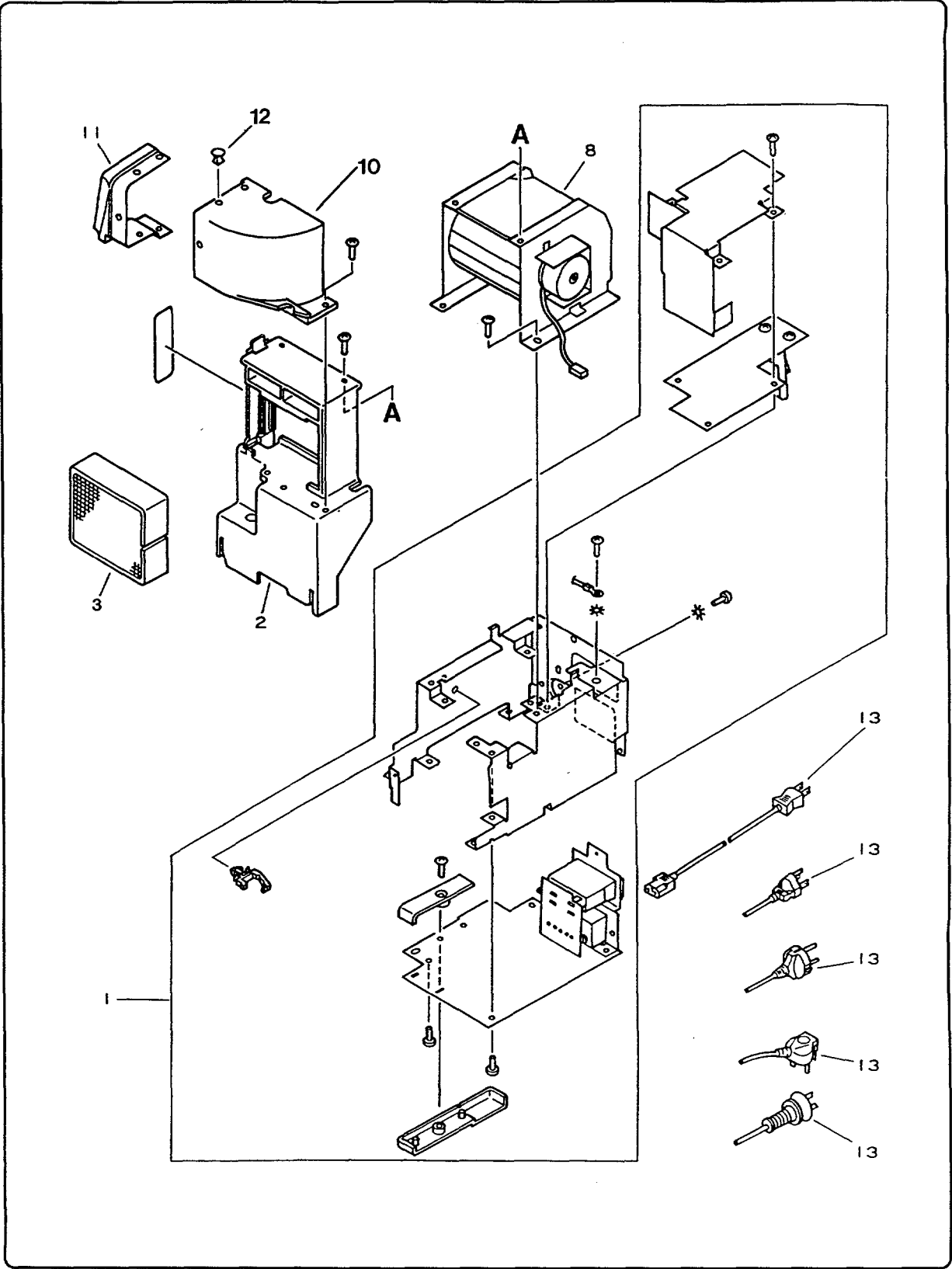


Figure 8-4B. AC Power Module and Upper Cooling Fan - HP 33440 and HP 33449

Table 8-4A. AC POWER MODULE AND UPPER COOLING FAN - HP 33440¹

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG9-0205-000CN	1		AC POWER MODULE 100/115V
1	RG9-0206-000CN	1		AC POWER MODULE 220/240V
2	RA1-4082-000CN	1		MOUNT, OZONE FILTER
3	RG1-1753-000CN	1		OZONE FILTER KIT
8	RH7-1074-000CN	1		FAN, UPPER COOLING
10	RA1-4083-000CN	1	S	DUCT, EXHAUST
11	RA1-5402-000CN	1	S	HOOD, EXHAUST
12	RA1-5424-000CN	3	S	CLIP, HOOD
13	See note below			POWER CORD

Table 8-4B. AC POWER MODULE AND UPPER COOLING FAN²






REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG9-0205-000CN	1		AC PWR MOD. 100/115V (HP 33440)
1	RG9-0206-000CN	1		AC PWR MOD. 220/240V (HP 33440)
1	RG9-0319-000CN	1		AC PWR MOD. 100/115V (HP 33449)
1	RG9-0325-060CN	1		AC PWR MOD. 220/240V (HP 33449)
2	RF1-2133-000CN	1		MOUNT, OZONE FILTER
3	RF1-2130-000CN	1		OZONE FILTER
8	RH7-1074-000CN	1		FAN, UPPER COOLING
10	RA1-7361-000CN	1	S	DUCT, EXHAUST
11	RA1-7362-000CN	1	S	HOOD, EXHAUST
12	RA1-5424-000CN	3	S	CLIP, HOOD
13	See note below			POWER CORD

¹Use this table for earlier HP 33440 printers without a user-replaceable ozone filter.

²Use this table for both the HP 33449 and those HP 33440's equipped with a user-replaceable ozone filter.

Note: Refer to the *Computer Users Catalog* from DMK for HP power cord ordering information. A portion of this catalog is reproduced below.

Power cords

Part no.	8120-1348 Black** 8120-1378 Gray**	8120-1351*	8120-1369*	8120-1689*	8120-2104*
Plug					
Voltage rating	125V	250V	250V	250V	250V

*Order from HP sales office.

**These power cords are 2.4m (7.5 ft.) long.

Power Cord Configurations

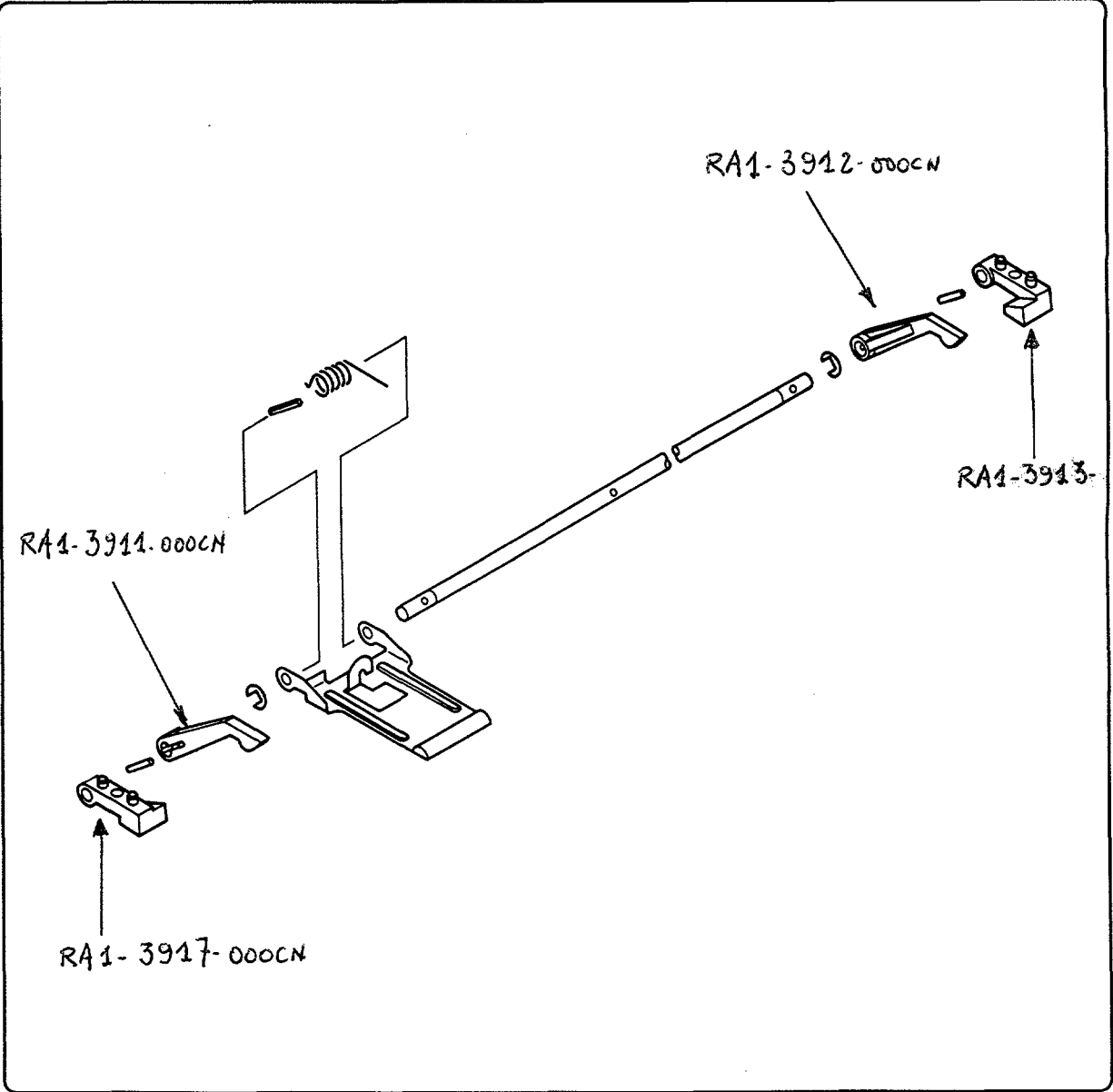


Figure 8-5. Pressure Assembly - HP 33440 and HP 33449

Table 8-5. PRESSURE ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0935-000CN	1		PRESSURE ASSEMBLY

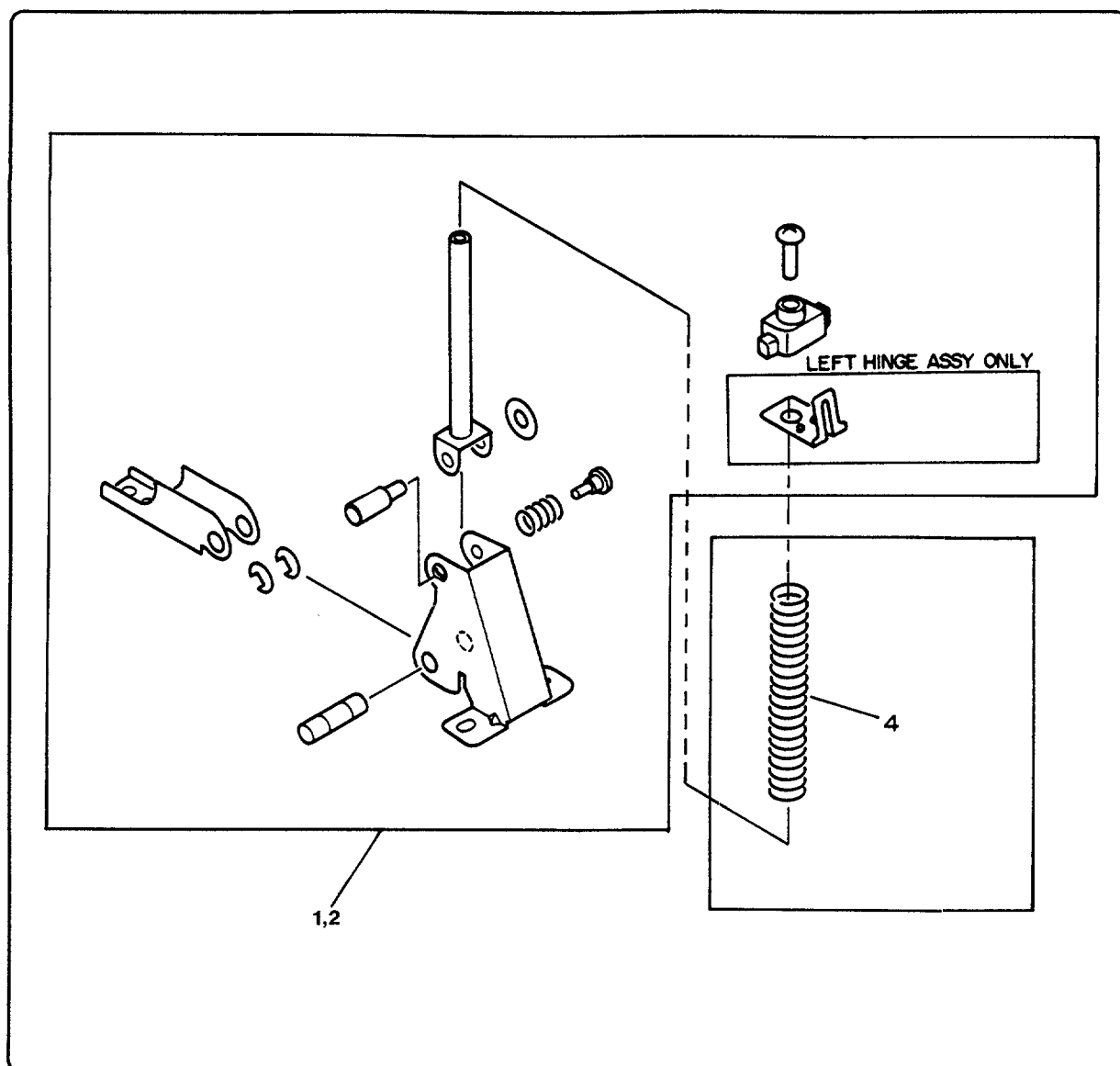


Figure 8-6. Hinge Assembly - HP 33440 and HP 33449

Table 8-6A. HINGE ASSEMBLY - HP 33440

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0969-000CN	1		HINGE ASSEMBLY, RIGHT
2	RG1-1153-000CN	1		HINGE ASSEMBLY, LEFT
4	RS1-2110-000CN	2		SPRING, HINGE ASSEMBLY

Table 8-6B. HINGE ASSEMBLY - HP 33449

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-1435-000CN	1		HINGE ASSEMBLY, RIGHT
2	RG1-1436-000CN	1		HINGE ASSEMBLY, LEFT
4	RS1-2110-000CN	2		SPRING, HINGE ASSEMBLY

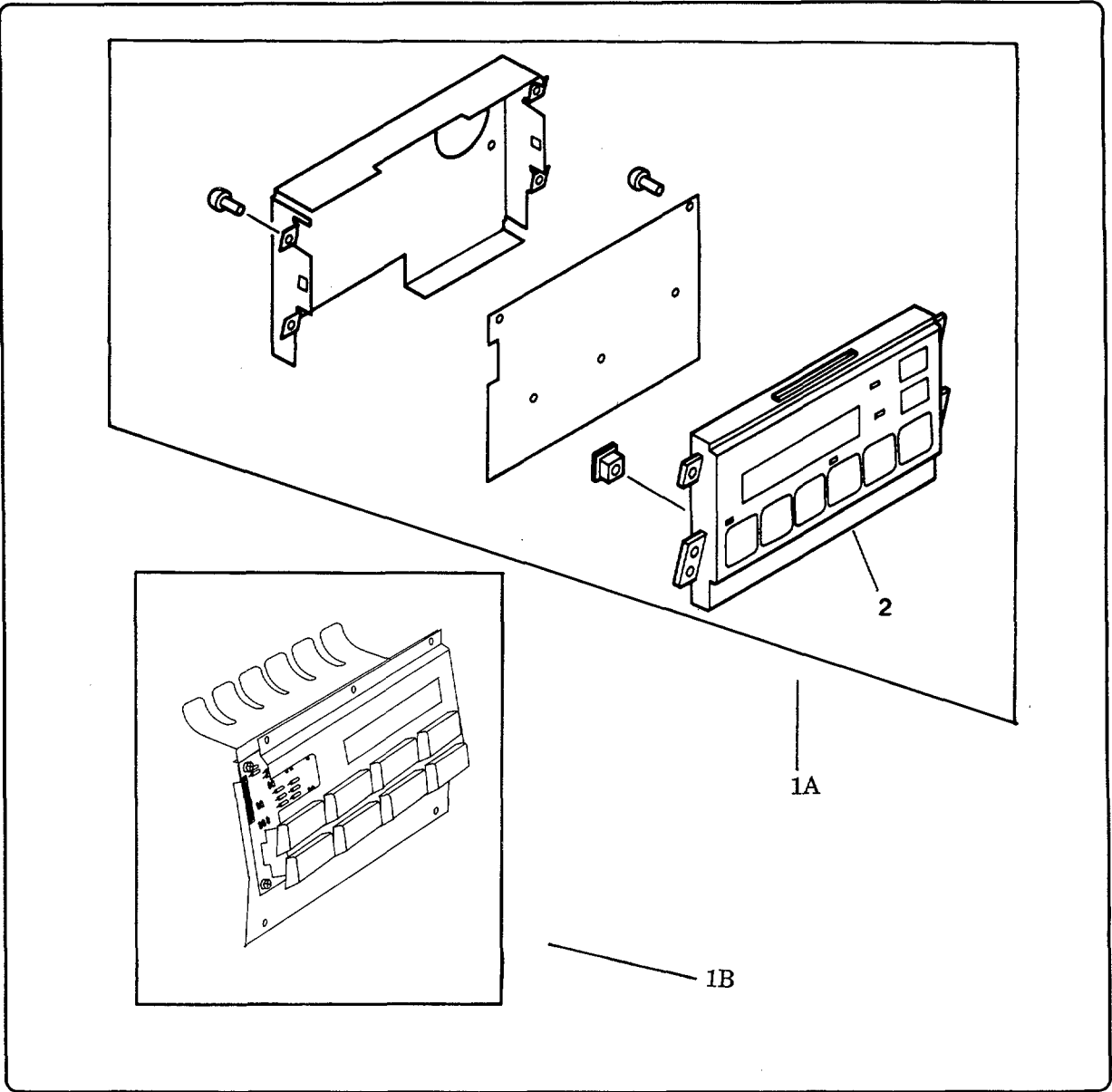


Figure 8-7. Control Panel Assembly - HP 33440 and HP 33449

Table 8-7A. CONTROL PANEL ASSEMBLY - HP 33440

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1A	RG1-0959-000CN	1		CONTROL PANEL ASSEMBLY
2	RF1-1383-000CN	1		CONTROL PANEL OVERLAY

Table 8-7B. CONTROL PANEL ASSEMBLY - HP 33449

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1B	RG1-1974-000CN	1		CONTROL PANEL ASSEMBLY

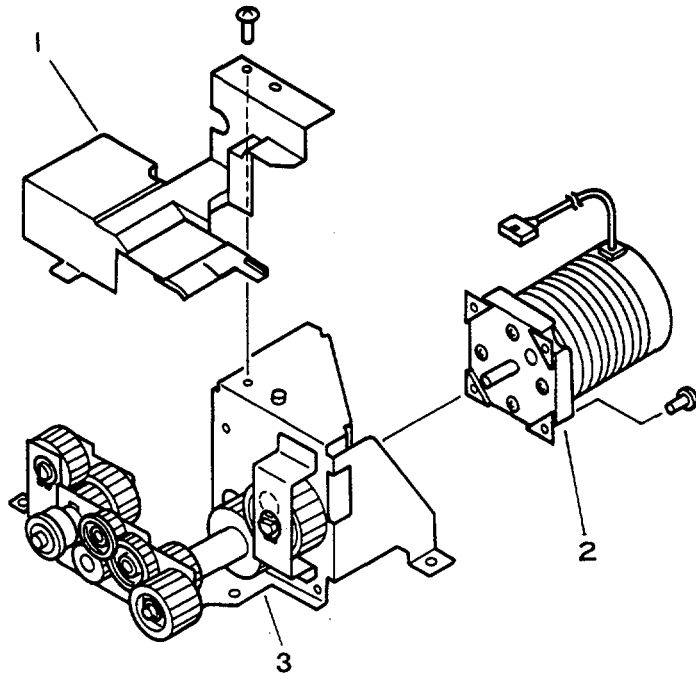


Figure 8-8. Main Motor and Drive Assembly - HP 33440 and HP 33449

Table 8-8. MAIN MOTOR AND DRIVE ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RF1-0998-000CN	1		COVER, GEAR
2	RH7-1048-000CN	1		MOTOR, MAIN DRIVE
3	RG1-0943-000CN	1		MAIN MOTOR DRIVE ASSEMBLY

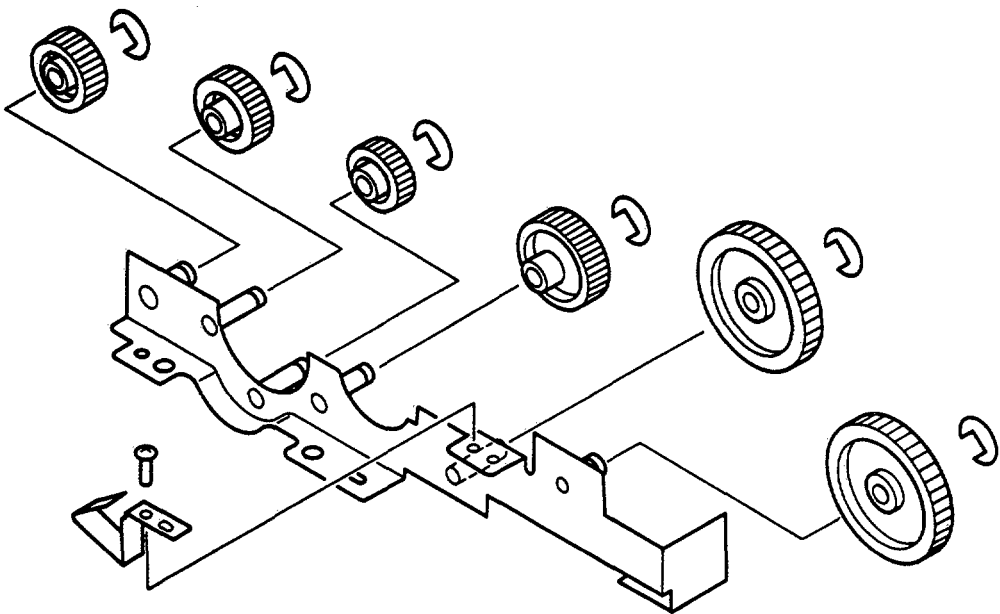


Figure 8-9. Feed Drive Assembly - HP 33440 and HP 33449

Table 8-9. FEED DRIVE ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0934-000CN	1		FEED DRIVE ASSEMBLY

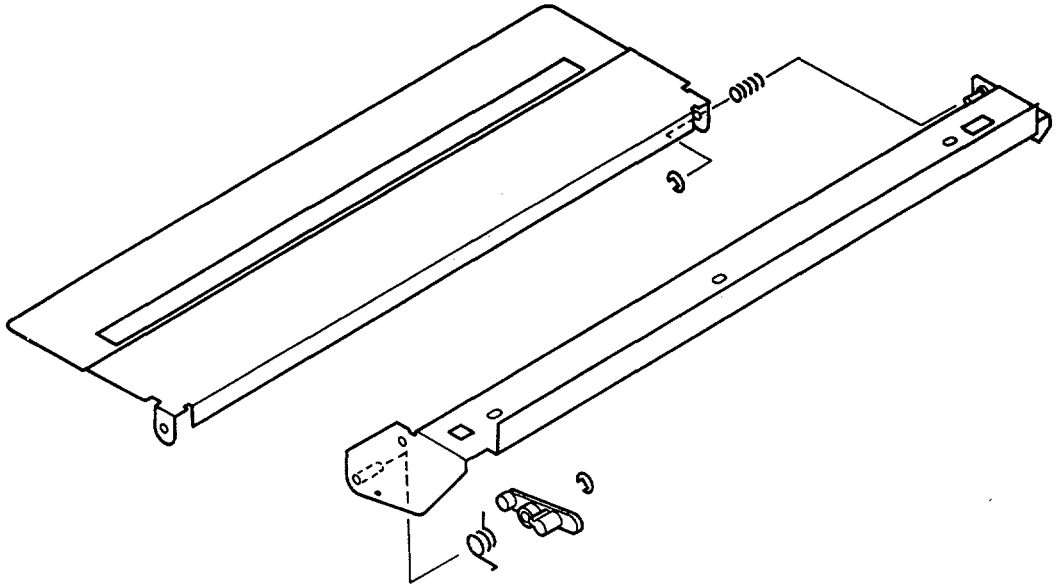


Figure 8-10. Mirror Shutter Assembly - HP 33440 and HP 33449

Table 8-10. MIRROR SHUTTER ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0929-000CN	1		MIRROR SHUTTER ASSEMBLY

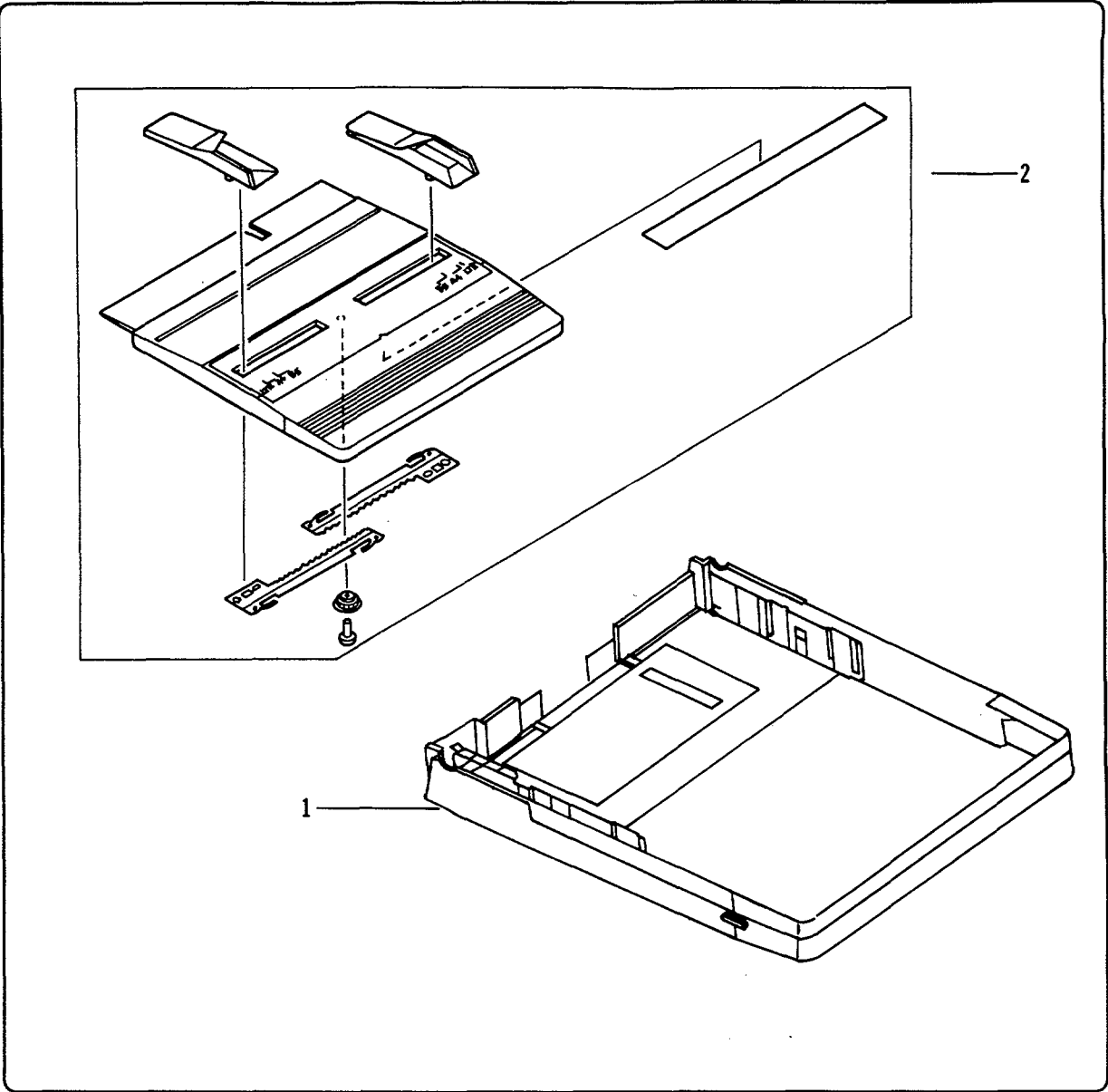


Figure 8-11A. Paper Tray Assembly and Top Cover - HP 33440

Table 8-11A. PAPER TRAY ASSEMBLY AND TOP COVER - HP 33440

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	92295B			TRAY, LETTER SIZE (8.5x11in)
1	92295C			TRAY, LEGAL SIZE (8.5x14in)
1	92295D			TRAY, A4 SIZE (210x297mm)
1	92295E			TRAY, EXECUTIVE SIZE (182x257mm)
1	92295F			TRAY, ENVELOPE
2	92295R			COVER, INPUT TRAY
2	92295S			COVER, LEGAL TRAY

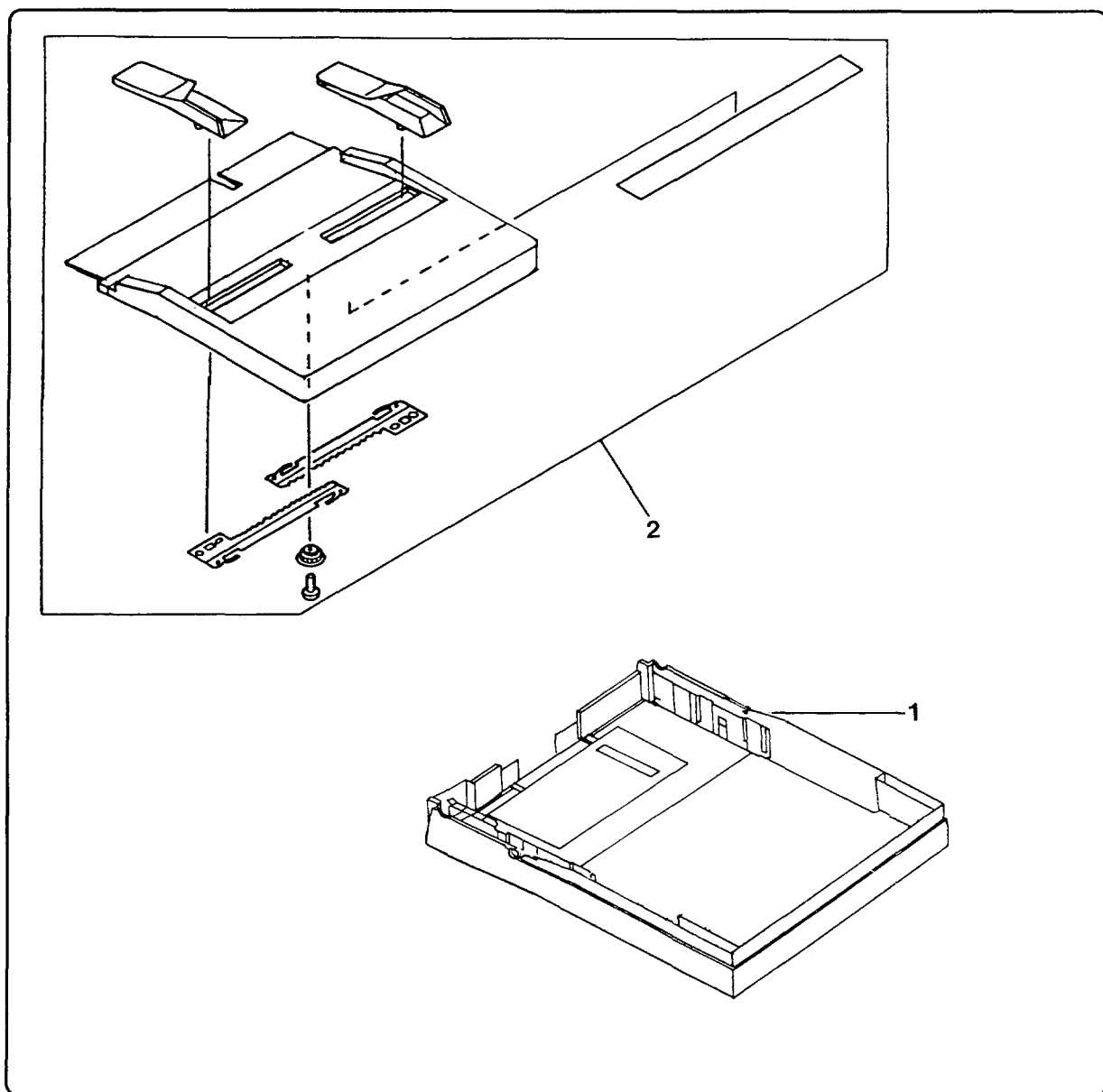


Figure 8-11B. Paper Tray Assembly and Top Cover - HP 33449

Table 8-11B. PAPER TRAY ASSEMBLY AND TOP COVER - HP 33449

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	92297B			TRAY, LETTER SIZE (8.5x11in)
1	92297C			TRAY, LEGAL SIZE (8.5x14in)
1	92297D			TRAY, A4 SIZE (210x297mm)
1	92297E			TRAY, EXECUTIVE SIZE (182x257mm)
1	92297F			TRAY, ENVELOPE
2	92297R			COVER, INPUT TRAY
2	92297S			COVER, LEGAL TRAY

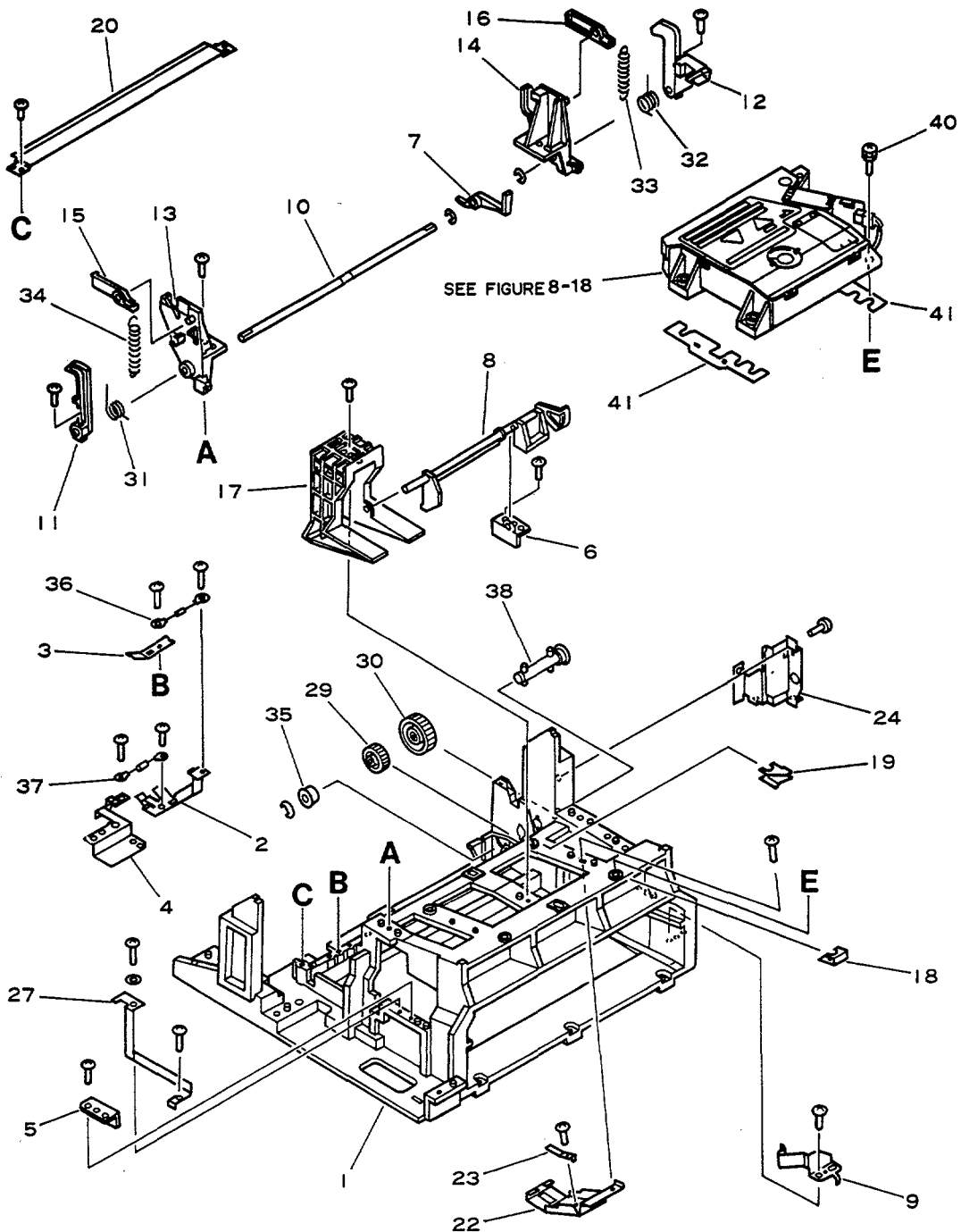


Figure 8-12. Main Body Assembly - HP 33440 and HP 33449

Table 8-12. MAIN BODY ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RA1-3821-000CN	1		BLOCK, MAIN BODY (HP 33440) +33449
1	RA1-4776-000CN	1		BLOCK, MAIN BODY (HP 33449)
2	RA1-3822-000CN	1	S	PLATE, GROUNDING A
3	RA1-3823-000CN	1	S	PLATE, GROUNDING B (HP 33440)
3	RA1-5479-000CN	1	S	PLATE, GROUNDING B (HP 33449)
4	RA1-3824-000CN	1	S	PLATE, GROUNDING C
5	RA1-3825-000CN	1	S	GUIDE, CASSETTE LEFT
6	RA1-3826-000CN	1		GUIDE, CASSETTE RIGHT
7	RA1-3827-000CN	1		ARM, LASER SHUTTER
8	RA1-3828-040CN	1		ARM, PAPER SENSING
9	RA1-3829-000CN	1	S	SPRING, LEAF
10	RA1-3830-000CN	1	S	SHAFT, HOOK
11	RA1-3831-000CN	1		HOOK, LEFT COVER LATCH
12	RA1-3832-000CN	1		HOOK, RIGHT COVER LATCH
13	RA1-3833-000CN	1		GUIDE, LEFT COVER LATCH HOOK
14	RA1-3834-000CN	1		GUIDE, RIGHT COVER LATCH HOOK
15	RA1-3835-000CN	1		LIFTER, LEFT
16	RA1-3836-000CN	1		LIFTER, RIGHT
17	RA1-3837-000CN	1		GUIDE, AUXILIARY
18	RA1-3838-000CN	1		NUT, SCANNER, A
19	RA1-3839-000CN	1		NUT, SCANNER, B
20	RA1-3864-000CN	1		GUIDE, UPPER TRANSFER
22	RA1-4320-000CN	1	S	COVER, LASER SHUTTER
23	RA1-4321-000CN	1	S	SPRING, LEAF
24	RA1-4319-000CN	1	S	PLATE, BLOCK SUPPORT
27	RA1-4318-000CN	1	S	PLATE, GROUNDING
29	RS1-0105-000CN	1		GEAR, 19 TOOTH
30	RS1-0106-000CN	1		GEAR, 57 TOOTH
31	RS1-2095-000CN	1		SPRING, TORSION
32	RS1-2096-000CN	1		SPRING, TORSION
33	RS1-2097-000CN	1		SPRING, TENSION
34	RS1-2112-000CN	1	S	SPRING, TENSION
35	XG3-6010-303CN	1		BEARING, BALL
36	RF1-2118-000CN	1		RESISTOR ASS'Y, 15 MOHM 1/4W
37	RF1-0841-000CN	1		RESISTOR, 1 KOHM 1/4W
38	RF1-0988-000CN	1		SHAFT, DRUM DRIVE
40	XA9-0375-000CN	4		SCREW, M3x25
41	RA1-5396-000CN	n/a	S	WASHER, SHIM

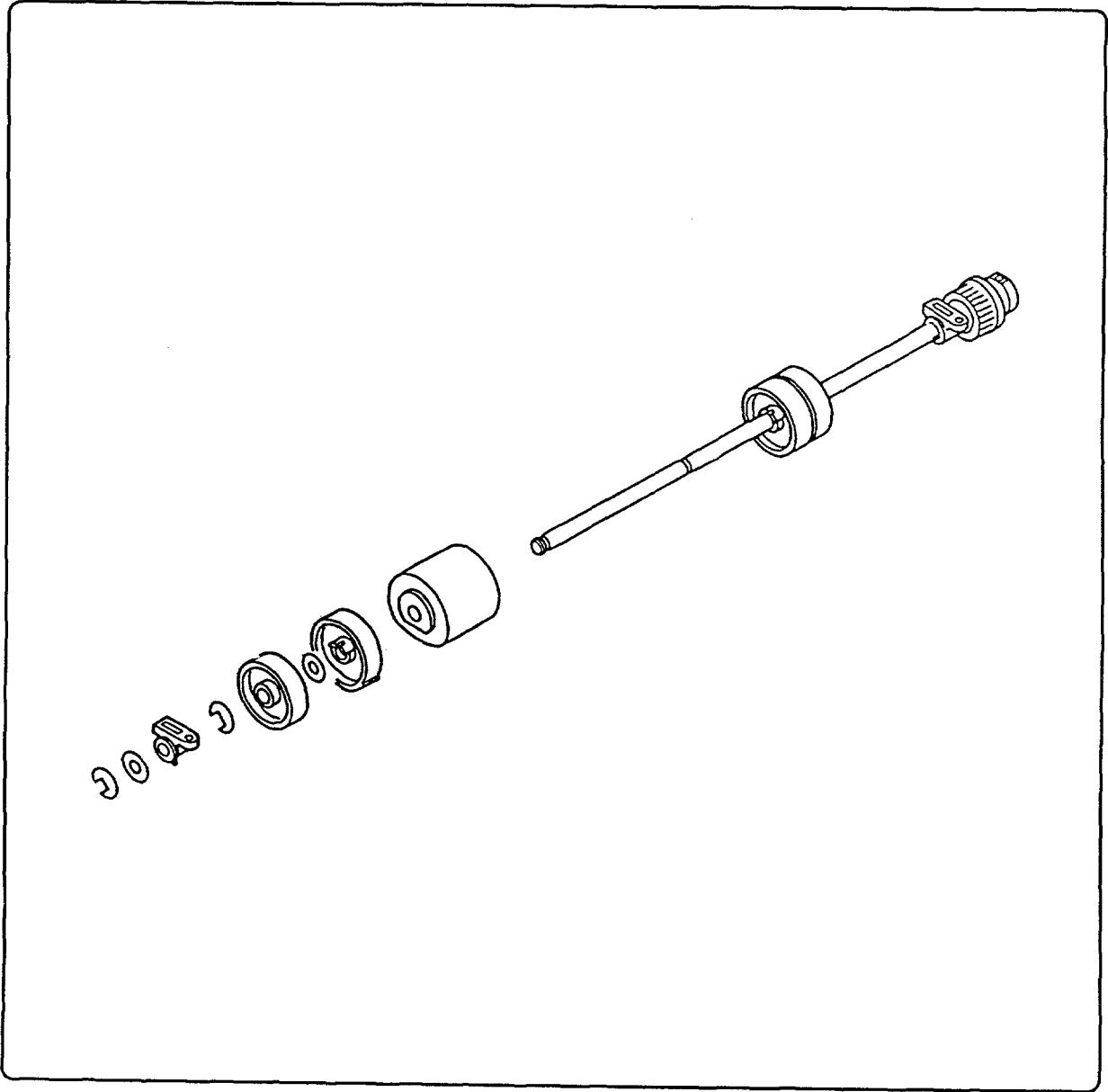


Figure 8-13. Feed Roller Assembly - HP 33440 and HP 33449

Table 8-13. FEED ROLLER ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0931-060CN	1		FEED ROLLER ASSEMBLY

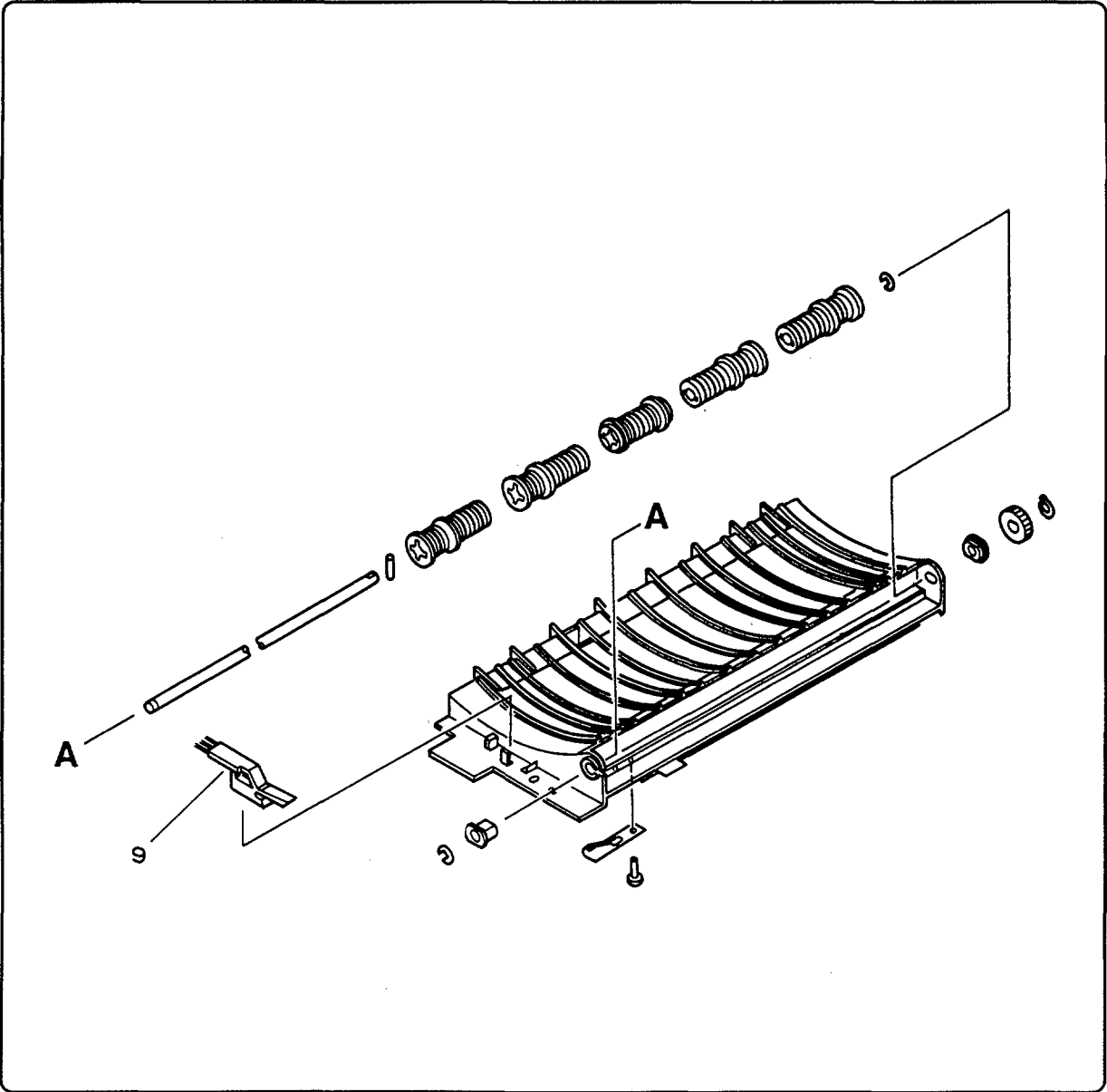


Figure 8-14. Feed Guide Assembly - HP 33440 and HP 33449

Table 8-14. FEED GUIDE ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0938-000CN	1		FEED GUIDE ASSEMBLY
9	RF1-1177-000CN	1		CLEANER

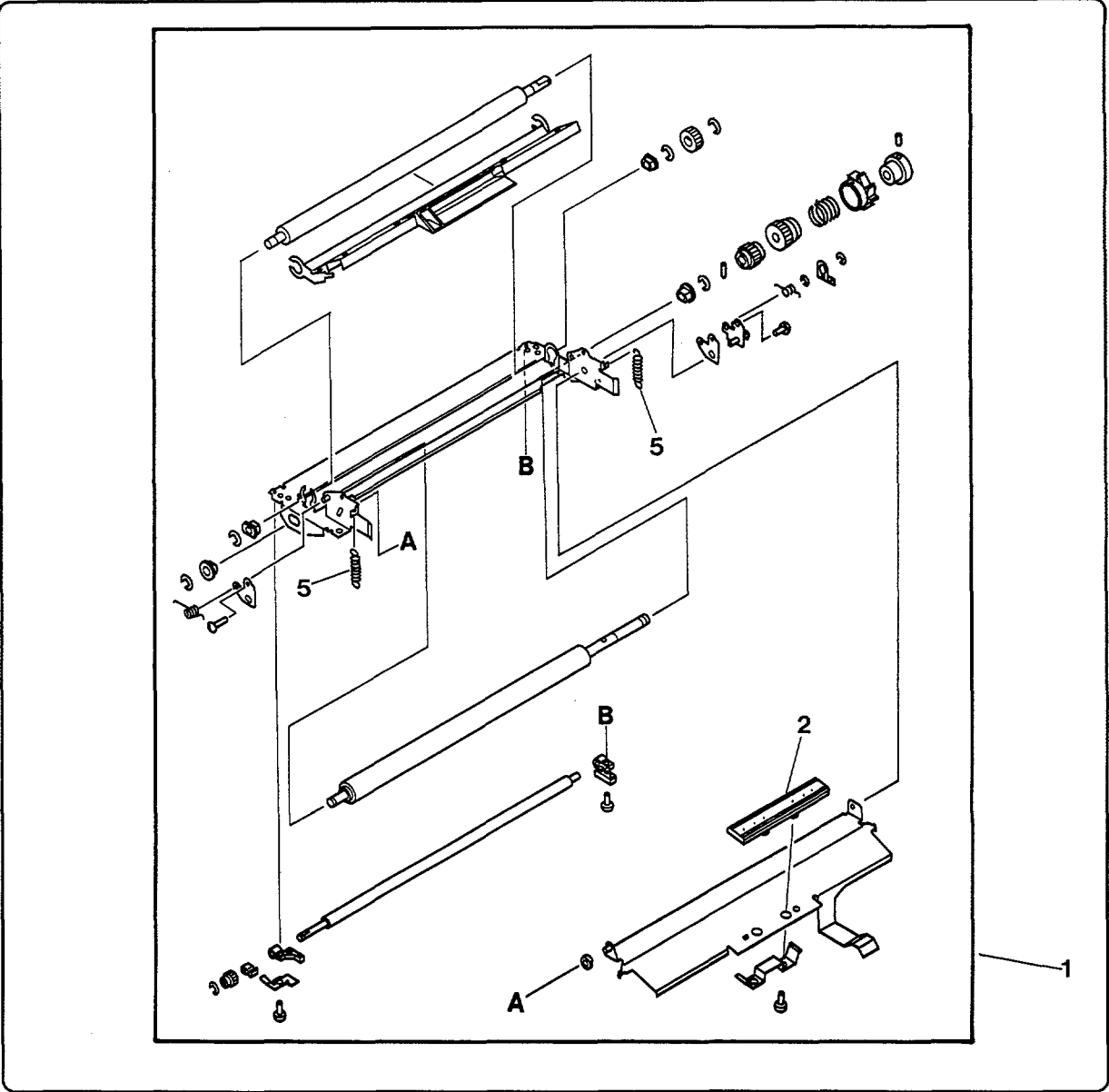


Figure 8-15. Registration Assembly - HP 33440 and HP 33449

Table 8-15. REGISTRATION ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0932-120CN	1		REGISTRATION ASSEMBLY
2	RF1-1145-020CN	1		PAD, SEPARATION
5	RA1-3871-000CN	2		SPRING, TENSION

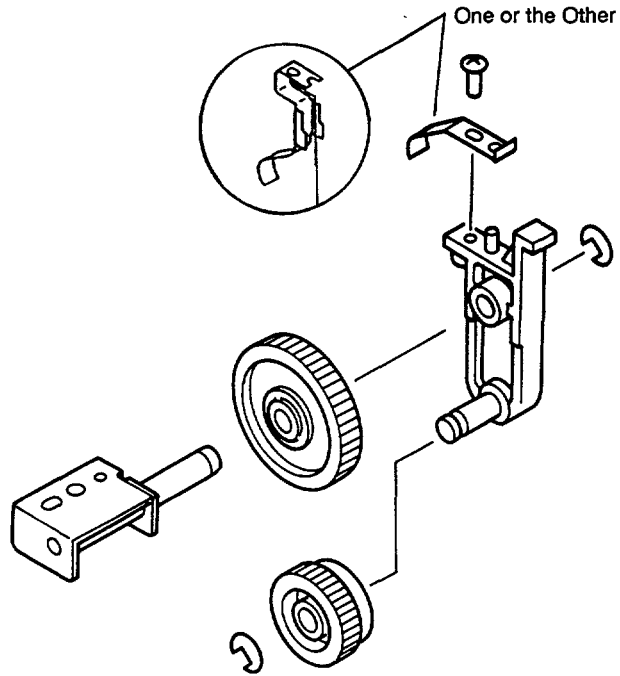


Figure 8-16. Delivery Coupler Assembly - HP 33440 and HP 33449

Table 8-16. DELIVERY COUPLER ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0967-000CN	1		DELIVERY COUPLER ASSEMBLY

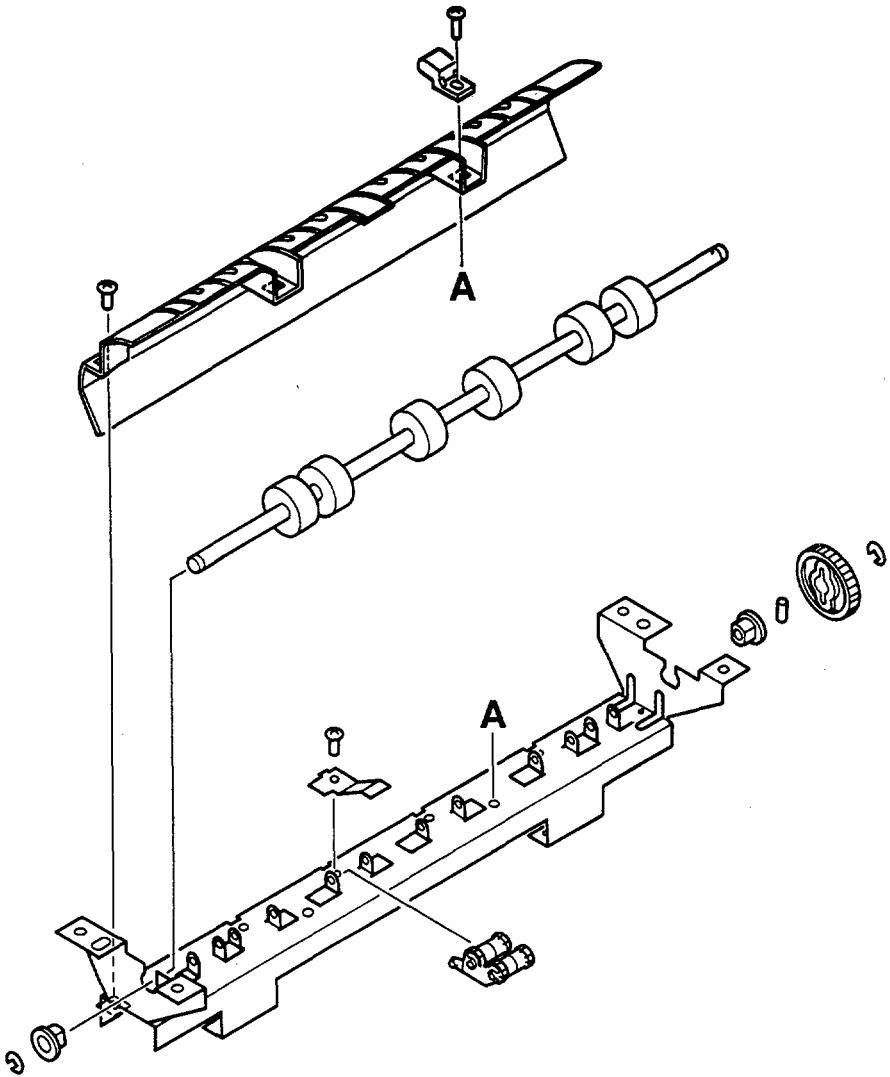


Figure 8-17. Delivery Assembly - HP 33440 and HP 33449

Table 8-17. DELIVERY ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0945-000CN	1		DELIVERY ASSEMBLY

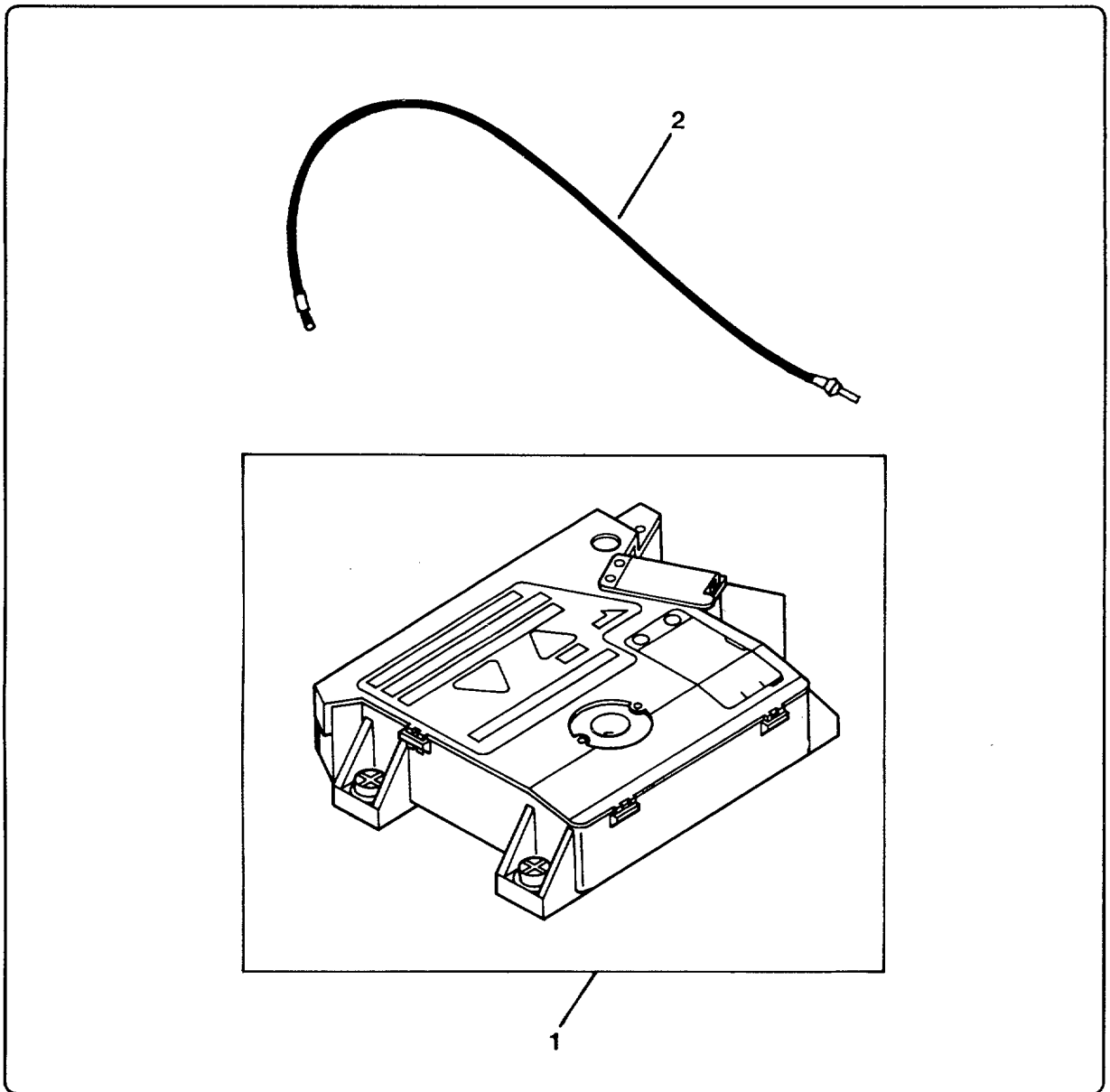


Figure 8-18. Laser Scanning Assembly - HP 33440 and HP 33449

Table 8-18. LASER SCANNING ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG0-0050-030CN	1		LASER/SCANNING ASSEMBLY
2	RH2-5053-000CN	1		FIBER OPTIC CABLE (HP 33440)
2	RH2-5108-000CN	1		FIBER OPTIC CABLE (HP 33449)

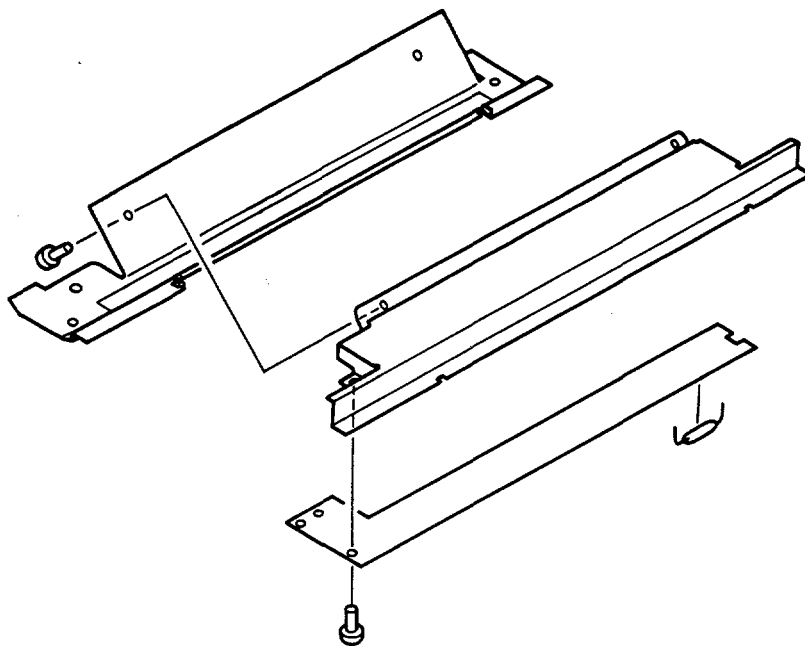


Figure 8-19. Erase Lamp Assembly - HP 33440 and HP 33449

Table 8-19. ERASE LAMP ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0946-000CN	1		ERASE LAMP ASSEMBLY

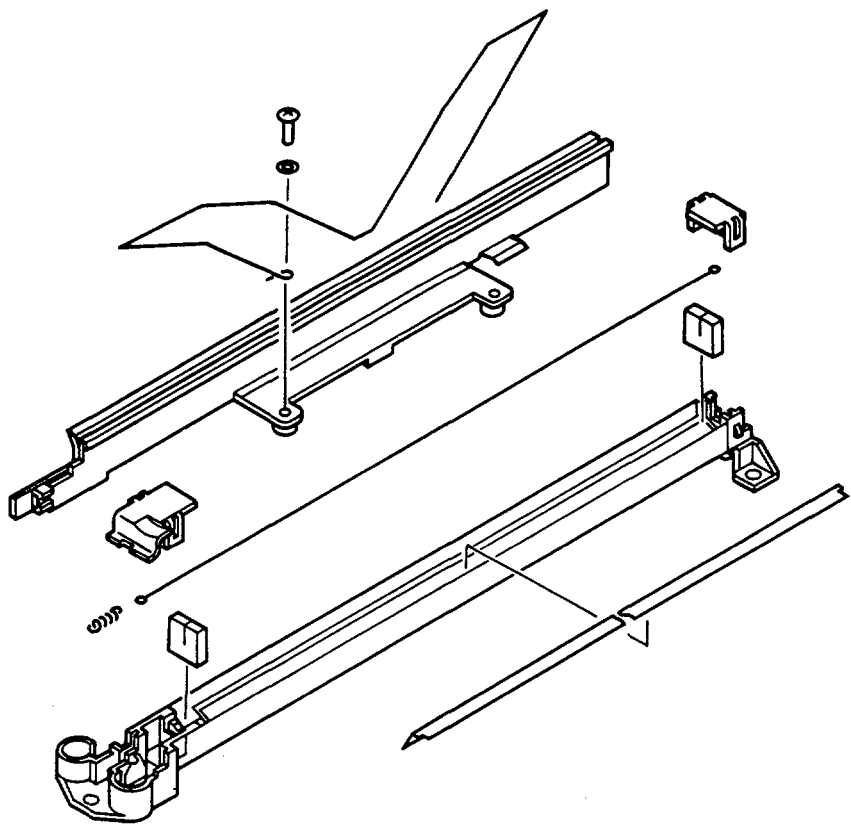


Figure 8-20. Transfer Corona Assembly - HP 33440 and HP 33449

Table 8-20. TRANSFER CORONA ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0933-060CN	1		TRANSFER CORONA ASSEMBLY

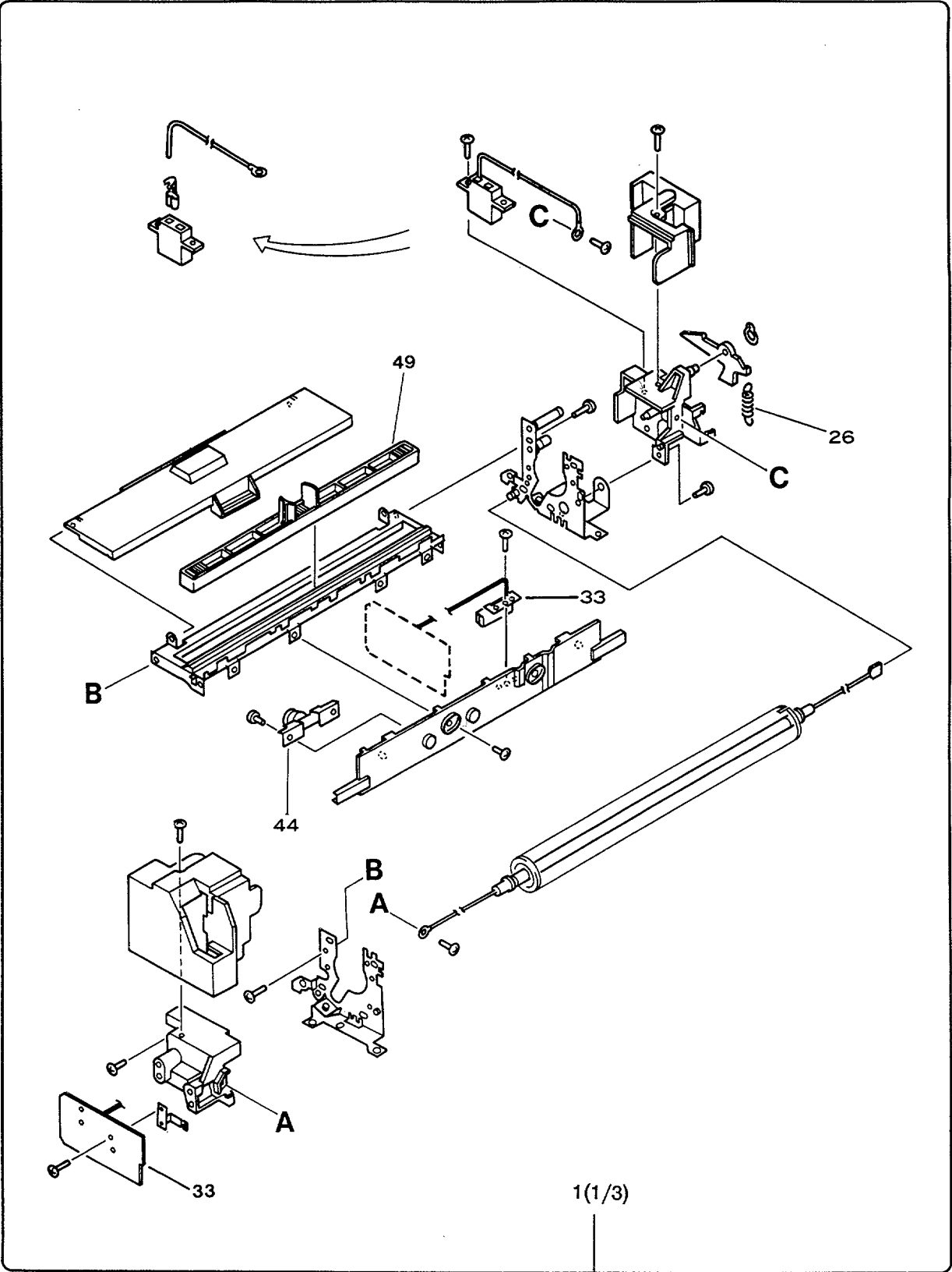


Figure 8-21. Fusing Assembly (1 of 3) - HP 33440 and HP 33449

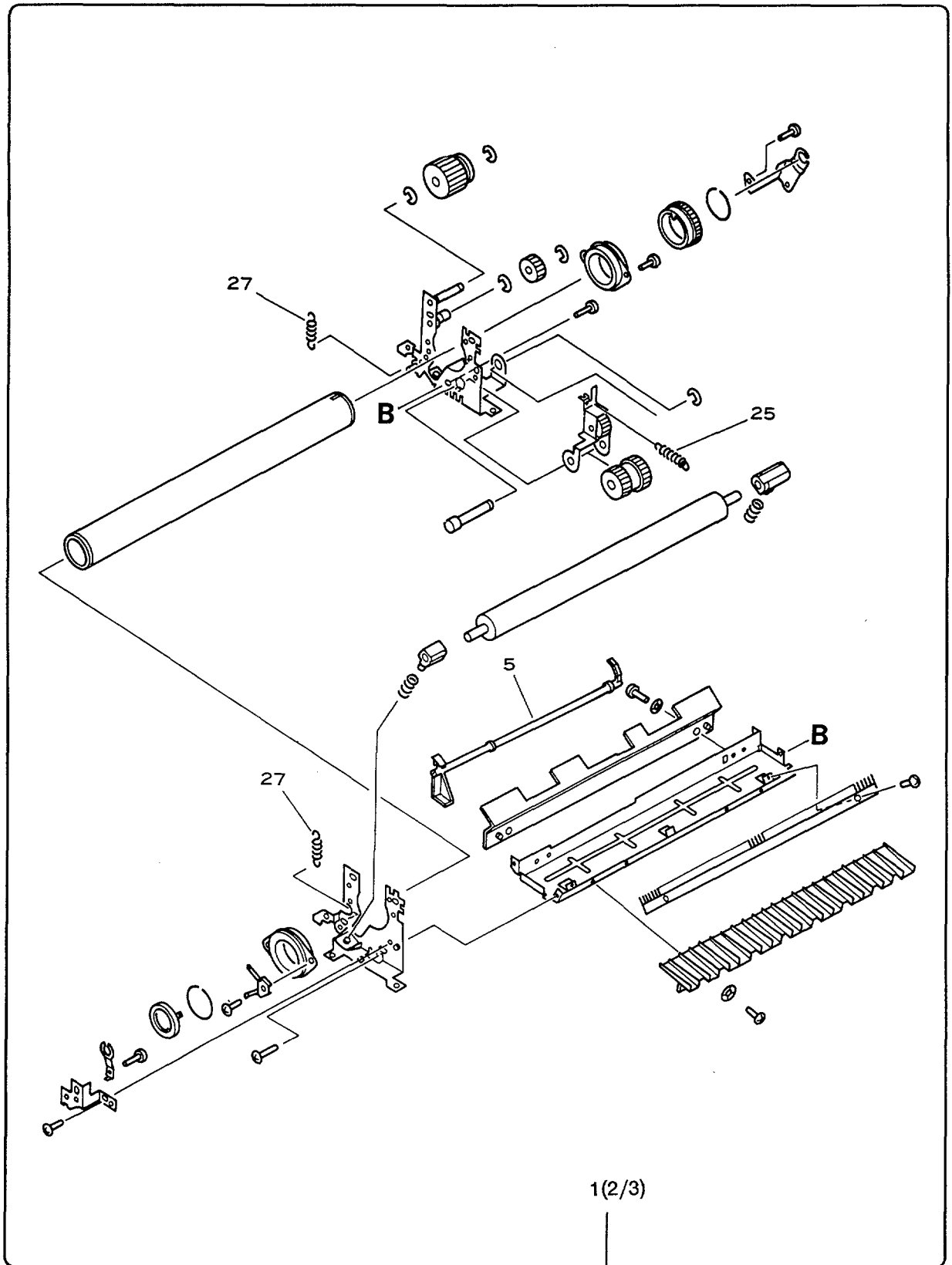


Figure 8-21. Fusing Assembly (2 of 3) - HP 33440 and HP 33449

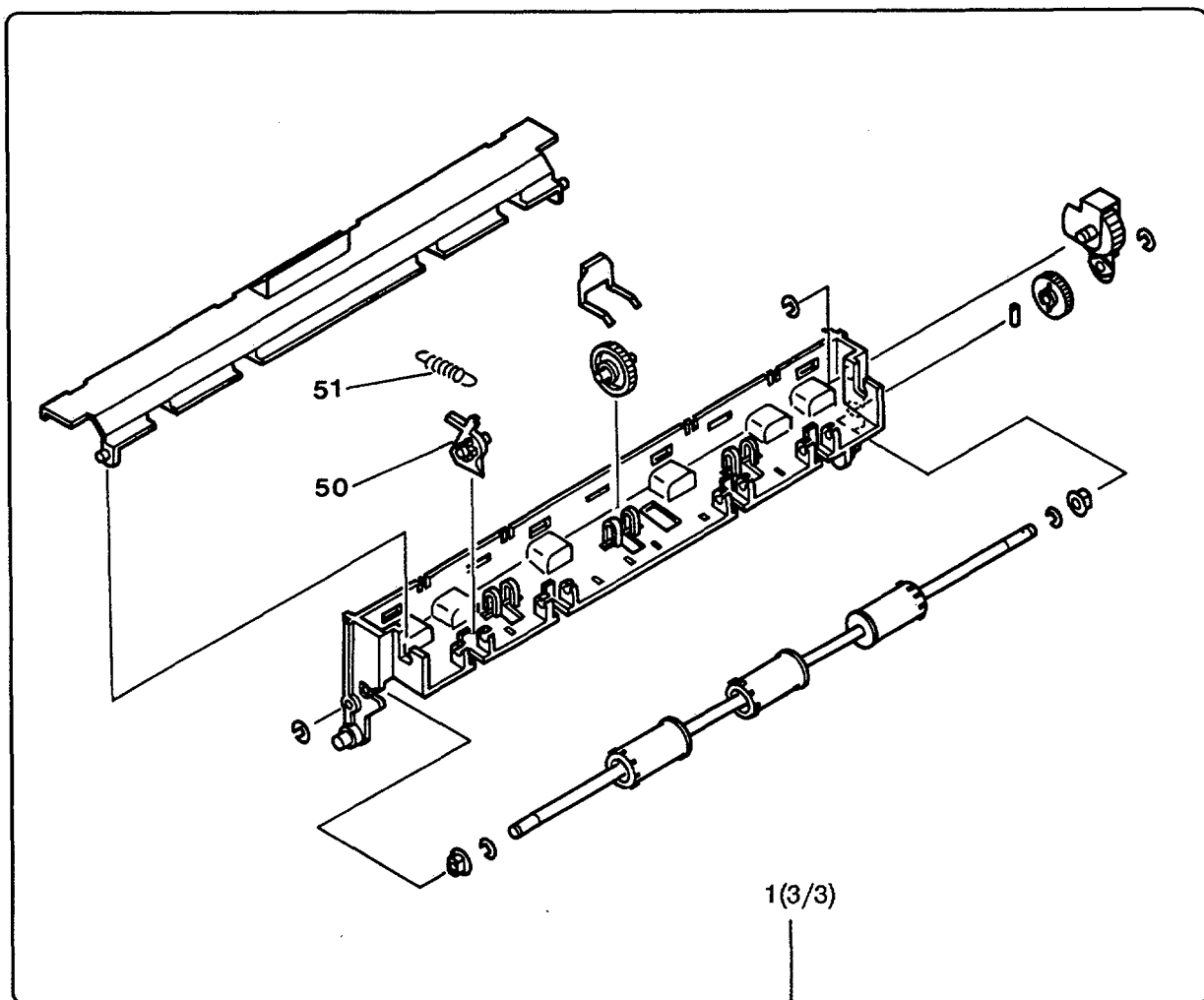


Figure 8-21. Fusing Assembly (3 of 3) - HP 33440 and HP 33449

Table 8-21. FUSING ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0939-230CN	1	New	FUSING ASSEMBLY (100/115V)
1	33440-69003	1	Rebuilt	FUSING ASSEMBLY (100/115V)
1	RG1-0940-000CN	1	New	FUSING ASSEMBLY (220/240V)
1	33440-69009	1	Rebuilt	FUSING ASSEMBLY (220/240V)
5	RA1-3942-000CN	1		ARM, EXIT SENSOR
25	RS1-2104-000CN	1		SPRING, TENSION
26	RS1-2105-000CN	1		SPRING, TENSION
27	RS1-2109-000CN	2		SPRING, TENSION
33	RG1-0719-000CN	1		THERMISTOR/EXIT SENSOR PCA
44	RF1-0842-000CN	1		THERMOPROTECTOR
49	RG1-0966-030CN	1		PAD, FUSER CLEANING
50	RA1-3971-000CN	4		PAWL (CLAW), SEPARATION
51	RS1-2106-000CN	4		SPRING, PAWL TENSION

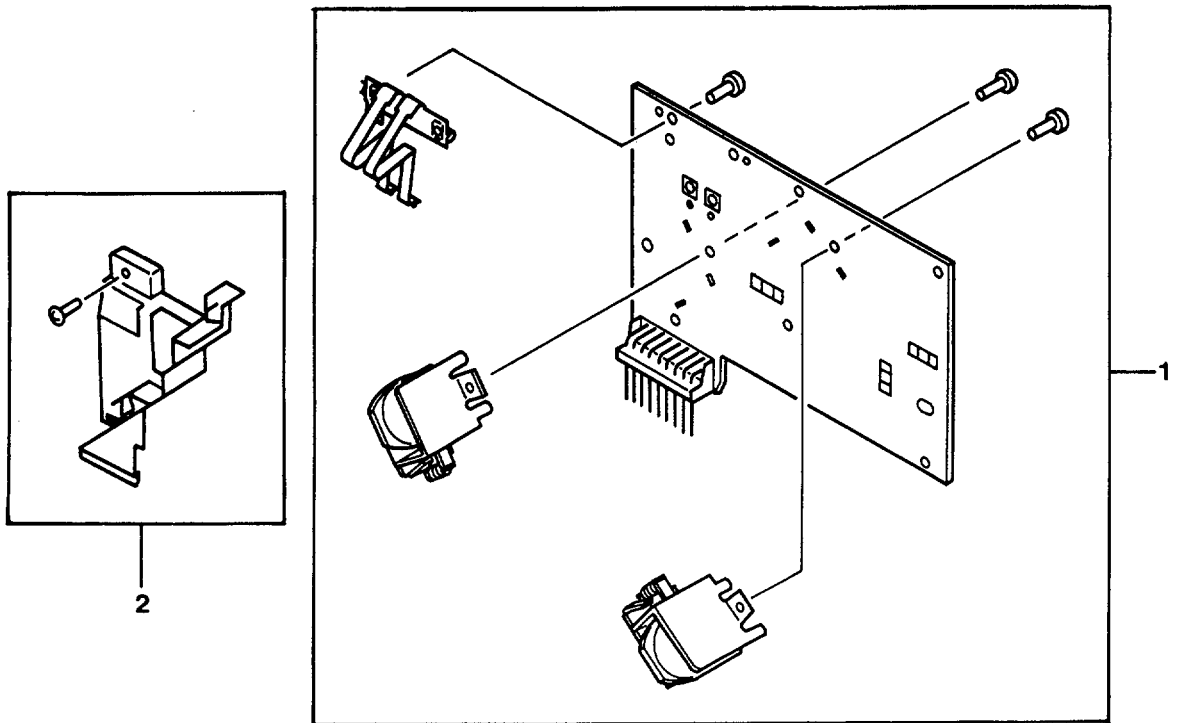


Figure 8-22. Paper Control PCA - HP 33440 and HP 33449

Table 8-22. PAPER CONTROL PCA

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0718-000CN	1		PAPER CONTROL PCA
2	RA1-4599-000CN	1		COVER, PAPER CONTROL PCA

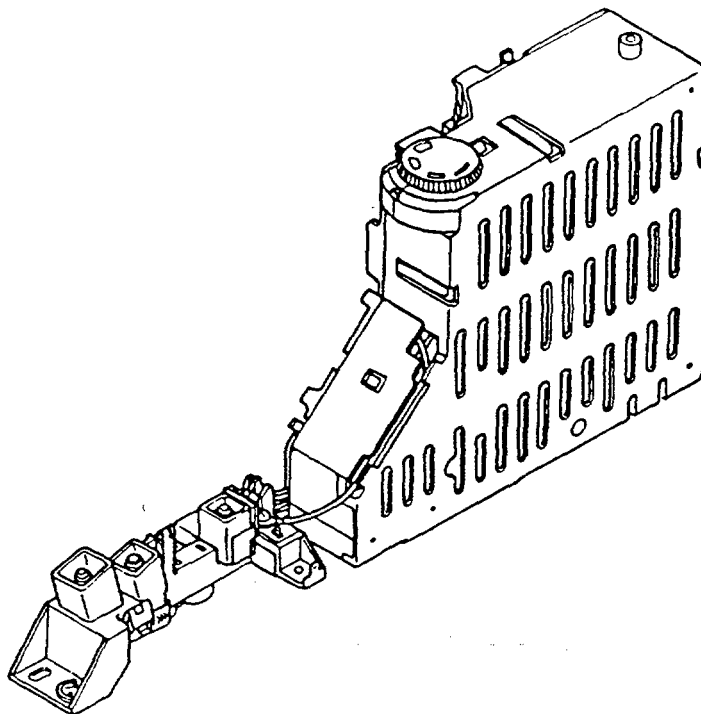


Figure 8-23. High-Voltage Power Supply Assembly - HP 33440 and HP 33449

Table 8-23. HIGH-VOLTAGE POWER SUPPLY ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0936-110CN	1		HIGH-VOLTAGE POWER SUPPLY ASSEMBLY

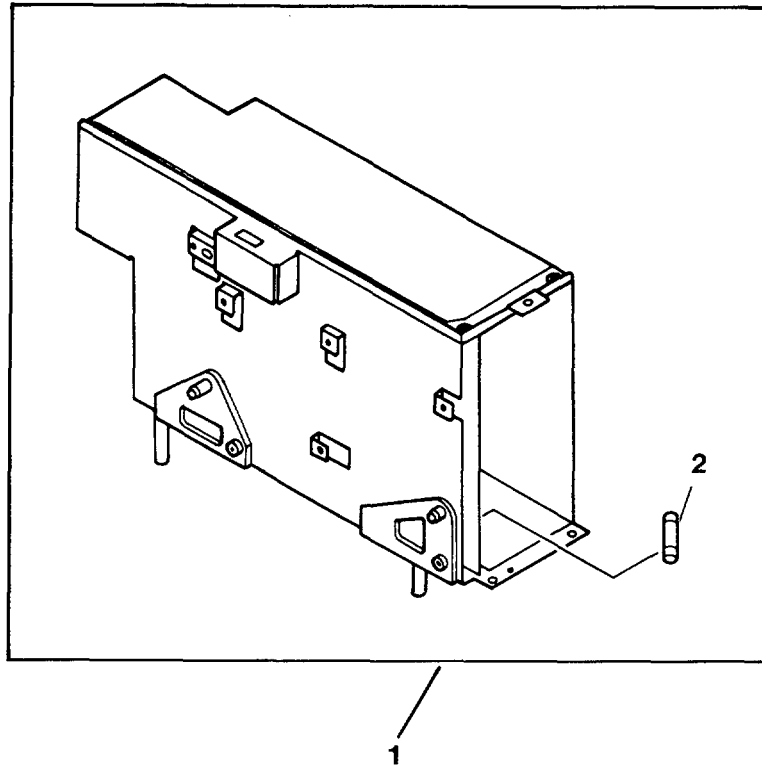


Figure 8-24. DC Power Supply Assembly - HP 33440 and HP 33449

Table 8-24. DC POWER SUPPLY ASSEMBLY

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-1394-020CN	1		DC POWER SUPPLY, 100/115V (HP 33440)
1	RG1-1395-000CN	1		DC POWER SUPPLY, 240V (HP 33440)
1	RG1-1975-000CN			DC POWER SUPPLY, 100/115V (HP 33449)
1	RG1-1977-000CN			DC POWER SUPPLY, 240V (HP 33449)
2	WD1-0222-000CN	1		DC POWER FUSE 250V/3.15A
2	WD1-0224-000CN	1		DC POWER FUSE 125V/6.3A

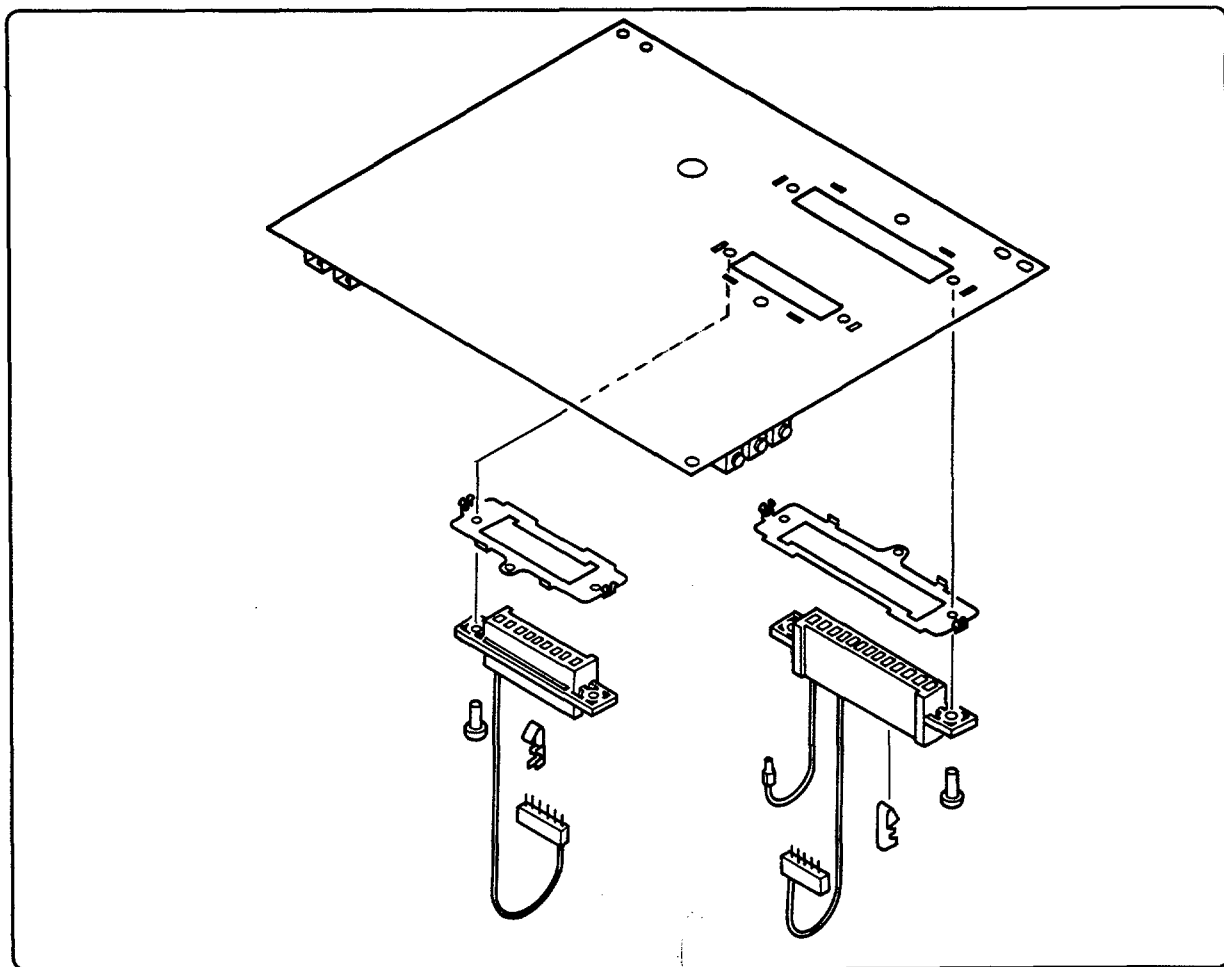


Figure 8-25. DC Controller PCA - HP 33440 and HP 33449

Table 8-25. DC CONTROLLER PCA

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	RG1-0710-090CN	1	New	DC CONTROLLER PCA (HP 33440)
1	33440-69002	1	Rebuilt	DC CONTROLLER PCA (HP 33440)
1	RG1-1969-000CN	1	New	DC CONTROLLER PCA (HP 33449)
1	33449-69002	1	Rebuilt	DC CONTROLLER PCA (HP 33449)

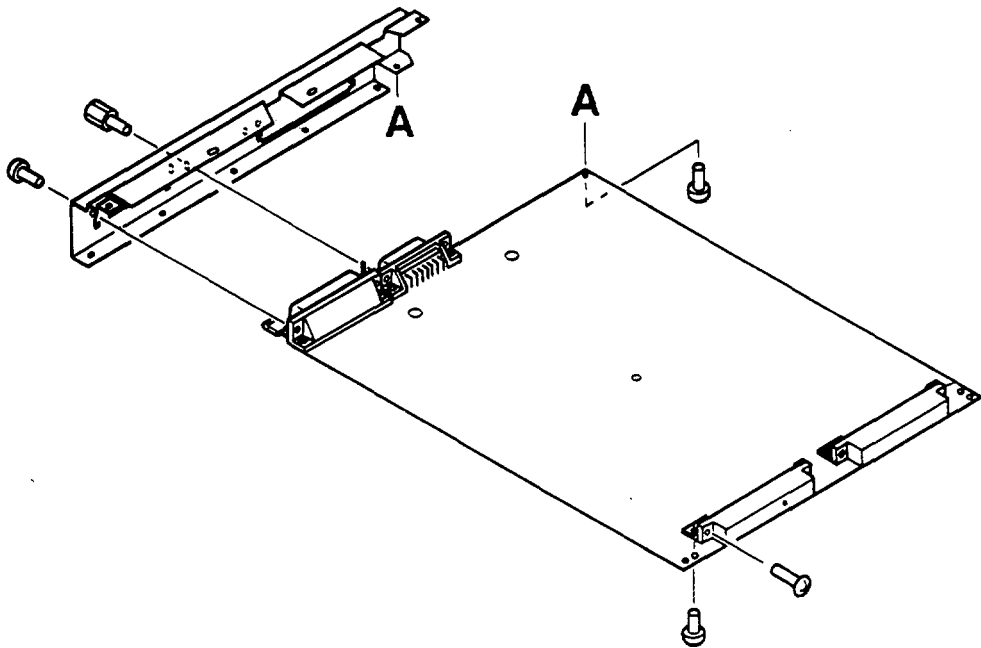


Figure 8-26. Interface/Formatter PCA - HP 33440 and HP 33449

Table 8-26. INTERFACE/FORMATTER PCA - HP 33440 AND HP 33449

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
1	SG4-6212-050CN	1	New	INTERFACE PCA (HP 33440)
1	33440-69001	1	Rebuilt	INTERFACE PCA (HP 33440)
1	33449-60001	1	New	FORMATTER PCA (HP 33449)
1	33449-69001	1	Rebuilt	FORMATTER PCA (HP 33449)

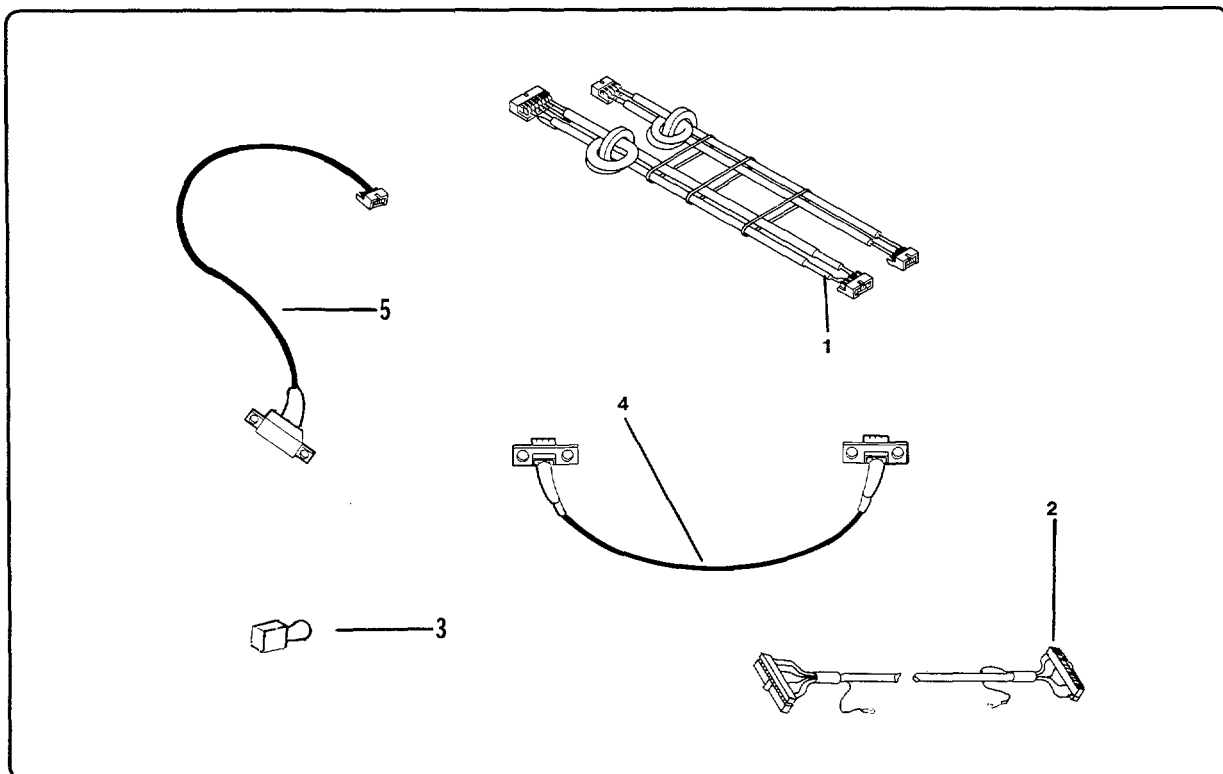


Figure 8-27. Control Panel Cable Assembly - HP 33440 and HP 33449

Table 8-27. CONTROL PANEL CABLE ASSEMBLY AND CONNECTOR CABLES

REF	PART NUMBER	QTY	NOTES	DESCRIPTION
2	SG4-6271-000CN	1		PANEL CABLE ASSEMBLY (HP 33440)
2	RG1-2307-000CN	1		PANEL CABLE ASSEMBLY (HP 33449)
4	RG1-0905-000CN	1		AC POWER MODULE/DC POWER SUPPLY CABLE
5	RG1-0906-000CN	1		HIGH-VOLTAGE POWER SUPPLY CABLE
5	RG1-0907-000CN	1		FUSING ASSEMBLY CABLE
1	RG1-0908-000CN	1		LASER/SCANNING CABLE ASSEMBLY
5	RG1-0912-000CN	1		AC POWER MODULE/DC CONTROLLER CABLE
3	VS1-0440-002CN	1		JUMPER: SIGNAL GND TO FRAME GROUND

8-3. PARTS INDEX

This alphabetical index references all Part Numbers. Part Numbers with initial numerics are listed first. HP 33440-specific parts have a single asterisk (*) following the Part Number. HP 33449-specific parts have two asterisks (**) following the Part Number. If a referenced Part Number appears in *both* the A and B versions of a table or figure, no A or B is given with the table or figure number; otherwise, an A or B will follow the table or figure number.

PARTS INDEX BY PART NUMBER

PART NUMBER	QTY	DESCRIPTION	REF	ITEM
0515-0055	n/a	SCREW, M3x6 WITH CAPTIVE STAR WASHER	Fig 8-3	20A
0515-1876	n/a	SCREW, PLATED PAN HEAD PHILLIPS MACHINE M4x6	Table 8-0	n/a
0515-1895	n/a	SCREW, PLATED PAN HEAD PHILLIPS MACHINE M3x8	Table 8-0	n/a
0515-1896	n/a	SCREW, PLATED PAN HEAD PHILLIPS MACHINE M3x6	Table 8-0	n/a
0515-1912	n/a	SCREW, PLATED PAN HEAD PHILLIPS MACHINE M4x8	Table 8-0	n/a
33440-69001*	1	INTERFACE PCA (HP33440) Rebuilt	Fig 8-26	1
33440-69002*	1	DC CONTROLLER PCA (HP33440) Rebuilt	Fig 8-25	1
33440-69003	1	FUSING ASS'Y (100/115V) Rebuilt	Fig 8-21	1
33440-69009	1	FUSING ASS'Y (220/240V) Rebuilt	Fig 8-21	1
33443B*	1	MEMORY PCA, 1 MBYTE	n/a	n/a
33443-69004*	1	MEMORY PCA, 1 MBYTE (Rebuilt)	n/a	n/a
33444B*	1	MEMORY PCA, 2 MBYTE	n/a	n/a
33444-69002*	1	MEMORY PCA, 2 MBYTE (Rebuilt)	n/a	n/a
33445B*	1	MEMORY PCA, 4 MBYTE	n/a	n/a
33445-69008*	1	MEMORY PCA, 4 MBYTE (Rebuilt)	n/a	n/a
33449-60001**	1	FORMATTER PCA (HP33449) New	Fig 8-26	1
33449-69001**	1	FORMATTER PCA (HP33449) Rebuilt	Fig 8-26	1
33449-69002**	1	DC CONTROLLER PCA (HP33449) Rebuilt	Fig 8-25	1
33474B**	n/a	MEMORY PCA, 1 MBYTE	n/a	n/a
33474-69004**	n/a	MEMORY PCA, 1 MBYTE (Rebuilt)	n/a	n/a
33475B**	n/a	MEMORY PCA, 2 MBYTE	n/a	n/a

*HP 33440 only. **HP 33449 only.

PARTS INDEX BY PART NUMBER

PART NUMBER	QTY	DESCRIPTION	REF	ITEM
33475-69011**	n/a	MEMORY PCA, 2 MBYTE (Rebuilt)	n/a	n/a
92295A	n/a	EP-S CARTRIDGE	n/a	1
92295B*	n/a	TRAY, LETTER SIZE (8.5x11 in.)	Fig 8-11A	1
92295C*	n/a	TRAY, LEGAL SIZE (8.5x14 in.)	Fig 8-11A	1
92295D*	n/a	TRAY, A4 SIZE (210x297mm)	Fig 8-11A	1
92295E*	n/a	TRAY, EXECUTIVE (182x257mm)	Fig 8-11A	1
92295F*	n/a	TRAY, ENVELOPE	Fig 8-11A	1
92295R*	n/a	COVER, INPUT TRAY	Fig 8-11A	2
92295S*	n/a	COVER, LEGAL TRAY	Fig 8-11A	2
92297B**	n/a	TRAY, LETTER SIZE (8.5x11 in.)	Fig 8-11B	1
92297C**	n/a	TRAY, LEGAL SIZE (8.5x14 in.)	Fig 8-11B	1
92297D**	n/a	TRAY, A4 SIZE (210x297mm)	Fig 8-11B	1
92297E**	n/a	TRAY, EXECUTIVE (182x257mm)	Fig 8-11B	1
92297F**	n/a	TRAY, ENVELOPE	Fig 8-11B	1
92297R**	n/a	COVER, INPUT TRAY	Fig 8-11B	2
92297S**	n/a	COVER, LEGAL TRAY	Fig 8-11B	2
RA1-3821-000CN*	1	BLOCK, MAIN BODY	Fig 8-12	1
RA1-3822-000CN	1	PLATE, GROUNDING A	Fig 8-12	2
RA1-3823-000CN*	1	PLATE, GROUNDING B	Fig 8-12	3
RA1-3824-000CN	1	PLATE, GROUNDING C	Fig 8-12	4
RA1-3825-000CN	1	GUIDE, CASSETTE LEFT	Fig 8-12	5
RA1-3826-000CN	1	GUIDE, CASSETTE RIGHT	Fig 8-12	6
RA1-3827-000CN	1	ARM, LASER SHUTTER	Fig 8-12	7
RA1-3828-040CN	1	ARM, PAPER SENSING	Fig 8-12	8
RA1-3829-000CN	1	SPRING, LEAF	Fig 8-12	9
RA1-3830-000CN	1	SHAFT, HOOK	Fig 8-12	10
RA1-3831-000CN	1	HOOK, LEFT COVER LATCH	Fig 8-12	11
RA1-3832-000CN	1	HOOK, RIGHT COVER LATCH	Fig 8-12	12
RA1-3833-000CN	1	GUIDE, LEFT COVER LATCH HOOK	Fig 8-12	13
RA1-3834-000CN	1	GUIDE, RIGHT COVER LATCH HOOK	Fig 8-12	14
*HP 33440 only. **HP 33449 only.				

PARTS INDEX BY PART NUMBER

PART NUMBER	QTY	DESCRIPTION	REF	ITEM
RA1-3835-000CN	1	LIFTER, LEFT	Fig 8-12	15
RA1-3836-000CN	1	LIFTER, RIGHT	Fig 8-12	16
RA1-3837-000CN	1	GUIDE, AUXILIARY	Fig 8-12	17
RA1-3838-000CN	1	NUT, SCANNER, A	Fig 8-12	18
RA1-3839-000CN	1	NUT, SCANNER, B	Fig 8-12	19
RA1-3864-000CN	1	GUIDE, UPPER TRANSFER	Fig 8-12	20
RA1-3871-000CN	2	SPRING, TENSION	Fig 8-15	5
RA1-3942-000CN	1	ARM, EXIT SENSOR	Fig 8-21	5
RA1-3971-000CN	4	PAWL (CLAW), SEPARATION	Fig 8-21	50
RA1-4019-000CN*	1	HOLDER, MAGNET	Fig 8-2A	1
RA1-4021-000CN	1	DEFLECTOR PAWL ASSEMBLY	Fig 8-2	2
RA1-4025-000CN	2	SPRING, LEAF	Fig 8-2	5
RA1-4030-000CN	1	PLATE, RHT HINGE BRACKET	Fig 8-2	12
RA1-4033-000CN	1	PLATE, LFT HINGE BRACKET	Fig 8-2	13
RA1-4034-000CN	1	SPRING A, GROUNDING	Fig 8-2	6
RA1-4035-000CN	1	SPRING B, GROUNDING	Fig 8-2	7
RA1-4036-000CN	1	ARM, CONNECTOR	Fig 8-2	8
RA1-4038-000CN	1	COVER, FUSER INSULATING	Fig 8-2	10
RA1-4042-000CN	2	SHAFT, LOCK	Fig 8-2	11
RA1-4045-020CN	2	SPRING, LEAF	Fig 8-2	14
RA1-4046-000CN	1	LEVER, INTERLOCK	Fig 8-2	15
RA1-4047-000CN	1	ELIMINATOR, STATIC CHARGE	Fig 8-2	16
RA1-4048-000CN	1	COVER, CONNECTOR ARM	Fig 8-2	17
RA1-4079-000CN	1	COVER, LAMP ASSEMBLY	Fig 8-2	27
RA1-4082-000CN*	1	MOUNT, OZONE FILTER	Fig 8-4A	2
RA1-4083-000CN*	1	DUCT, EXHAUST	Fig 8-4A	10
RA1-4113-000CN	4	FOOT	Fig 8-3	20
RA1-4114-000CN	1	PLATE, DC CONTROLLER MOUNTING	Fig 8-3	1
*HP 33440 only. **HP 33449 only.				

PARTS INDEX BY PART NUMBER

PART NUMBER	QTY	DESCRIPTION	REF	ITEM
RA1-4115-050CN	1	TERMINAL	Fig 8-3	2
RA1-4132-000CN*	1	GUIDE, FRONT, D-RAM PCA	Fig 8-3A	5
RA1-4133-000CN*	1	GUIDE, REAR, D-RAM PCA	Fig 8-3A	6
RA1-4134-000CN	1	GUIDE, RIGHT, EXPANSION PCA	Fig 8-3	7
RA1-4135-000CN	1	GUIDE, LEFT, EXPANSION, PCA	Fig 8-3	8
RA1-4138-000CN*	1	GUIDE, UPPER, CARTRIDGE	Fig 8-3A	11
RA1-4139-000CN*	1	GUIDE, LOWER, CARTRIDGE	Fig 8-3A	12
RA1-4146-050CN	1	PLATE, TERMINAL	Fig 8-3	22
RA1-4147-000CN	1	SHIELD, DC PWR SUPPLY CABLE	Fig 8-3	23
RA1-4148-000CN*	1	SHIELD, FRONT CARTRIDGE	Fig 8-3A	24
RA1-4149-000CN*	1	SUPPORT, PANEL A	Fig 8-3A	25
RA1-4150-000CN*	1	SUPPORT, PANEL B	Fig 8-3A	26
RA1-4161-000CN	1	MOUNT, TRAY SIZE SENSING	Fig 8-3	27
RA1-4162-000CN	3	LEVER, TRAY SIZE SENSING	Fig 8-3	28
RA1-4167-000CN	1	INSULATOR, LEFT, FUSING ASS'Y	Fig 8-3	35
RA1-4168-000CN	1	INSULATOR, RIGHT, FUSING ASS'Y	Fig 8-3	36
RA1-4170-000CN	1	PLATE, FRONT SUPPORT	Fig 8-3	37
RA1-4231-000CN*	1	PANEL, FRONT LOWER	Fig 8-1A	2
RA1-4232-000CN*	1	PANEL, FRONT UPPER	Fig 8-1A	3
RA1-4233-000CN*	1	PANEL, RIGHT	Fig 8-1A	4
RA1-4234-000CN*	1	PANEL, LEFT	Fig 8-1A	5
RA1-4235-000CN*	1	RELEASE BUTTON	Fig 8-1A	7
RA1-4282-000CN*	1	PLATE, SERVICE COVER	Fig 8-3A	3
RA1-4283-000CN*	2	KNOB	Fig 8-3A	4
RA1-4285-000CN*	1	PANEL, FRONT CARTRIDGE	Fig 8-3A	9
RA1-4290-000CN	1	TRAY, UPPER REAR OUTPUT	Fig 8-2	3
RA1-4292-000CN*	1	PANEL, REAR DELIVERY	Fig 8-2A	4
RA1-4294-000CN*	1	COVER, LOWER DELIVERY	Fig 8-2A	26
RA1-4296-000CN*	1	PLATE, D-RAM	Fig 8-3A	14
*HP 33440 only. **HP 33449 only.				

PARTS INDEX BY PART NUMBER

PART NUMBER	QTY	DESCRIPTION	REF	ITEM
RA1-4317-000CN	1	SPRING, LEAF	Fig 8-3	42
RA1-4318-000CN	1	PLATE, GROUNDING	Fig 8-12	27
RA1-4319-000CN	1	PLATE, BLOCK SUPPORT	Fig 8-12	24
RA1-4320-000CN	1	COVER, LASER SHUTTER	Fig 8-12	22
RA1-4321-000CN	1	SPRING, LEAF	Fig 8-12	23
RA1-4599-000CN	1	COVER, PAPER CONTROL PCA	Fig 8-22	2
RA1-4637-000CN	1	SHAFT, TRAY SIZE LEVER	Fig 8-3	29
RA1-4638-000CN	1	COVER, LEVER	Fig 8-3	38
RA1-4776-000CN**	1	BLOCK, MAIN BODY	Fig 8-12	1
RA1-5256-000CN	1	PLATE, LEFT LOCK	Fig 8-2	37
RA1-5257-000CN	1	PLATE, RIGHT LOCK	Fig 8-2	38
RA1-5258-000CN	1	SHAFT, SPRING	Fig 8-2	33
RA1-5361-000CN*	1	LATCH	Fig 8-2A	34
RA1-5362-000CN*	1	SPRING, LEAF	Fig 8-2A	35
RA1-5363-000CN*	1	SHAFT, LATCH	Fig 8-2A	36
RA1-5396-000CN	n/a	WASHER, SHIM	Fig 8-12	41
RA1-5402-000CN*	1	HOOD, EXHAUST	Fig 8-4A	11
RA1-5403-030CN	1	MOUNT, SWITCH LEVER	Fig 8-3B	49
RA1-5404-000CN	1	PLATE, LEVER	Fig 8-3B	50
RA1-5423-000CN	1	INSULATION SHEET	Fig 8-3	43
RA1-5424-000CN	3	CLIP, HOOD	Fig 8-4	12
RA1-5479-000CN**	1	PLATE, GROUNDING B	Fig 8-12	3
RA1-5489-000CN	1	PLATE	Fig 8-3	44
RA1-5490-000CN	1	STAND, FAN MOUNT	Fig 8-3	4
RA1-6047-000CN**	1	PLATE, SERVICE COVER	Fig 8-3B	3
RA1-7361-000CN	1	DUCT, EXHAUST	Fig 8-4B	10
RA1-7362-000CN	1	HOOD, EXHAUST	Fig 8-4B	11
RA1-8011-000CN**	1	PLATE, GROUNDING	Fig 8-3B	46
RA1-8273-000CN**	1	PANEL, BOTTOM COVER	Fig 8-1B	56
RA1-8275-000CN**	1	PANEL, REAR DELIVERY	Fig 8-2B	4

*HP 33440 only. **HP 33449 only.

PARTS INDEX BY PART NUMBER

PART NUMBER	QTY	DESCRIPTION	REF	ITEM
RA1-8276-000CN**	1	COVER, UPPER DELIVERY	Fig 8-2B	41
RA1-8278-000CN**	1	RELEASE BUTTON	Fig 8-1B	5
RA1-8284-000CN**	1	PANEL, MEMORY COVER	Fig 8-1B	57
RA1-8285-000CN**	1	PANEL, TEST COVER	Fig 8-1B	58
RA1-8287-000CN**	1	COVER, LOWER DELIVERY	Fig 8-2B	26
RA1-8289-000CN**	1	GUIDE, DRAM CENTER	Fig 8-3B	6
RA1-8290-000CN**	1	GUIDE, FONT CARTRIDGE	Fig 8-1B	9
RA1-8292-000CN**	1	GUIDE, DRAM REAR	Fig 8-3B	5
RA1-8293-000CN**	1	GUARD, I/O CONNECTOR	Fig 8-1B	59
RA1-8295-000CN**	1	SHIELD, FONT CARTRIDGE	Fig 8-3B	24
RA1-8299-000CN**	1	PLATE, DRAM ACCESS	Fig 8-3B	14
RA1-8302-000CN**	1	GUIDE, FONT CARTRIDGE	Fig 8-3B	11
RF1-0841-000CN	1	RESISTOR, 1 KOHM 1/4W	Fig 8-12	37
RF1-0842-000CN	1	THERMOPROTECTOR	Fig 8-21	44
RF1-0926-000CN	1	SPRING, RIGHT, MIRROR	Fig 8-2	22
RF1-0929-000CN	1	SPRING, LEFT, MIRROR	Fig 8-2	24
RF1-0947-000CN	1	GUIDE, EP CARTRIDGE	Fig 8-2	9
RF1-0975-000CN	1	COVER, BOTTOM	Fig 8-3A	19
RF1-0977-000CN	1	PANEL, TOP COVER ASSEMBLY	Fig 8-2A	23
RF1-0985-000CN	1	TRAY, LOWER REAR OUTPUT	Fig 8-2A	25
RF1-0988-000CN	1	SHAFT, DRUM DRIVE	Fig 8-12	38
RF1-0998-000CN	1	COVER, GEAR	Fig 8-8	1
RF1-1145-020CN	1	PAD, SEPARATION	Fig 8-15	2
RF1-1177-000CN	1	CLEANER	Fig 8-14	9
RF1-1383-000CN*	1	CONTROL PANEL OVERLAY	Fig 8-7	2
RF1-2118-000CN	1	RESISTOR ASS'Y, 15 MOHM 1/4W	Fig 8-12	36
RF1-2130-000CN	1	OZONE FILTER	Fig 8-4B	3
RF1-2133-000CN	1	MOUNT, OZONE FILTER	Fig 8-4B	2
RF1-2572-000CN**	1	PANEL, FRONT	Fig 8-1B	1
RF1-2574-000CN**	1	PANEL, TOP	Fig 8-1B	2
*HP 33440 only. **HP 33449 only.				

PARTS INDEX BY PART NUMBER

PART NUMBER	QTY	DESCRIPTION	REF	ITEM
RF1-2575-000CN**	1	PANEL, RIGHT	Fig 8-1B	3
RF1-2576-000CN**	1	PANEL, LEFT	Fig 8-1B	4
RF1-2577-000CN**	1	COVER, BOTTOM	Fig 8-3B	19
RF1-2579-000CN**	1	PANEL, TOP COVER ASSEMBLY	Fig 8-2B	23
RF1-2580-000CN**	1	TRAY, LOWER REAR OUTPUT	Fig 8-2B	25
RG0-0050-030CN	1	LASER/SCANNING ASSEMBLY	Fig 8-18	1
RG0-0052-000CN	1	MIRROR ASSEMBLY	Fig 8-2	31
RG1-0710-090CN*	1	DC CONTROLLER PCA (HP 33440)	Fig 8-25	1
RG1-0718-000CN	1	PAPER CONTROL PCA	Fig 8-22	1
RG1-0719-000CN	1	THERMISTOR/EXIT SENSOR PCA	Fig 8-21	33
RG1-0905-000CN	1	AC PWR MOD./DC PWR SUP. CABLE	Fig. 8-27	4
RG1-0906-000CN	1	HIGH-VOLTAGE PWR SUP. CABLE	Fig. 8-27	4
RG1-0907-000CN	1	FUSING ASSEMBLY CABLE	Fig. 8-27	4
RG1-0908-000CN	1	LASER/SCANNING CABLE ASSEMBLY	Fig. 8-27	1
RG1-0912-000CN	1	AC PWR MOD./DC CONTROL. CABLE	Fig 8-27	4
RG1-0929-000CN	1	MIRROR, SHUTTER ASSEMBLY	Fig 8-10	1
RG1-0931-060CN	1	FEED ROLLER ASSEMBLY	Fig 8-13	1
RG1-0932-120CN	1	REGISTRATION ASSEMBLY	Fig 8-15	1
RG1-0933-060CN	1	TRANSFER CORONA ASSEMBLY	Fig 8-20	1
RG1-0934-000CN	1	FEED DRIVE ASSEMBLY	Fig 8-9	1
RG1-0935-000CN	1	PRESSURE ASSEMBLY	Fig 8-5	1
RG1-0936-110CN	1	HIGH-VOLTAGE PWR SUPPLY ASS'Y	Fig 8-23	1
RG1-0938-000CN	1	FEED GUIDE ASSEMBLY	Fig 8-14	1
RG1-0939-230CN	1	FUSING ASSEMBLY (100/115) (New)	Fig 8-21	1
RG1-0940-000CN	1	FUSING ASSEMBLY (220/240V) (New)	Fig 8-21	1
RG1-0943-000CN	1	MAIN MOTOR DRIVE ASSEMBLY	Fig 8-8	3
RG1-0945-000CN	1	DELIVERY ASSEMBLY	Fig 8-17	1
RG1-0946-000CN	1	ERASE LAMP ASSEMBLY	Fig 8-19	1
RG1-0959-000CN*	1	CONTROL PANEL	Fig 8-7	1
RG1-0966-030CN	1	PAD, FUSER CLEANING	Fig 8-21	49
*HP 33440 only. **HP 33449 only.				

PARTS INDEX BY PART NUMBER

PART NUMBER	QTY	DESCRIPTION	REF	ITEM
RG1-0967-000CN	1	DELIVERY COUPLER ASSEMBLY	Fig 8-16	1
RG1-0969-000CN*	1	HINGE ASSEMBLY, RIGHT (HP 33440)	Fig 8-6	1
RG1-1153-000CN*	1	HINGE ASSEMBLY, LEFT (HP 33440)	Fig 8-6	2
RG1-1394-020CN*	1	DC PWR SUP. 100/115V (HP 33440)	Fig 8-24	1
RG1-1395-000CN*	1	DC POWER SUPPLY 240V (HP 33440)	Fig 8-24	1
RG1-1435-000CN**	1	HINGE ASSEMBLY, RIGHT (HP 33449)	Fig 8-6	1
RG1-1436-000CN**	1	HINGE ASSEMBLY, LEFT (HP 33449)	Fig 8-6	2
RG1-1753-000CN*	1	OZONE FILTER KIT	Fig 8-4A	3
RG1-1969-000CN**	1	DC CONTROLLER PCA (HP 33449) New	Fig 8-25	1
RG1-1974-000CN**	1	CONTROL PANEL ASSEMBLY	Fig 8-7	1
RG1-1975-000CN**	1	DC PWR SUP. 100/115V (HP 33449)	Fig 8-24	1
RG1-1977-000CN**	1	DC POWER SUPPLY 240V (HP 33449)	Fig 8-24	1
RG1-2307-000CN**	1	PANEL CABLE ASS'Y (HP 33449)	Fig 8-27	2
RG9-0205-000CN*	1	AC PWR MOD. 100/115V (HP 33440)	Fig 8-4	1
RG9-0206-000CN*	1	AC PWR MOD. 220/240V (HP 33440)	Fig 8-4	1
RG9-0319-000CN**	1	AC PWR MOD. 100/115V (HP 33449)	Fig 8-4B	1
RG9-0325-060CN**	1	AC PWR MOD. 220/240V (HP 33449)	Fig 8-4B	1
RH2-5051-000CN	1	CONNECTOR	Fig 8-3	34
RH2-5053-000CN*	1	FIBER OPTIC CABLE (HP 33440)	Fig 8-18	2
RH2-5108-000CN**	1	FIBER OPTIC CABLE (HP 33449)	Fig 8-18	2
RH7-1048-000CN	1	MOTOR, MAIN DRIVE	Fig 8-8	2
RH7-1056-000CN	1	FAN, LOWER COOLING	Fig 8-3	21
RH7-1074-000CN	1	FAN, UPPER COOLING	Fig 8-4	8
RS1-0105-000CN	1	GEAR, 19 TOOTH	Fig 8-12	29
RS1-0106-000CN	1	GEAR, 57 TOOTH	Fig 8-12	30
RS1-2095-000CN	1	SPRING, TORSION	Fig 8-12	31
RS1-2096-000CN	1	SPRING, TORSION	Fig 8-12	32
RS1-2097-000CN	1	SPRING, TENSION	Fig 8-12	33
RS1-2101-000CN	1	SPRING, TORSION	Fig 8-2	19
RS1-2104-000CN	1	SPRING, TENSION	Fig 8-21	25
*HP 33440 only. **HP 33449 only.				

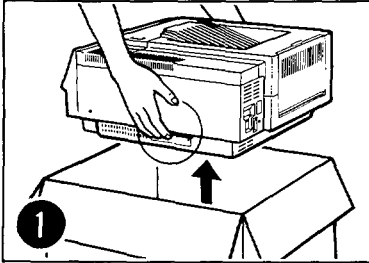
PARTS INDEX BY PART NUMBER

PART NUMBER	QTY	DESCRIPTION	REF	ITEM
RS1-2105-000CN	1	SPRING, TENSION	Fig 8-21	26
RS1-2106-000CN	4	SPRING, PAWL TENSION	Fig 8-21	51
RS1-2109-000CN	2	SPRING, TENSION	Fig 8-21	27
RS1-2110-000CN	2	SPRING, COMPRESSION	Fig 8-6	4
RS1-2112-000CN	1	SPRING, TENSION	Fig 8-12	34
RS1-2149-000CN*	1	SPRING, TENSION	Fig 8-1A	8
RS1-2152-000CN	1	SPRING, TENSION	Fig 8-2	32
SA4-6202-000CN	1	PLATE, OPT I/O DUST	Fig 8-3	41
SG4-6212-050CN*	1	INTERFACE PCA (HP 33440)	Fig 8-26	1
SG4-6271-000CN*	1	PANEL CABLE ASS'Y (HP 33440)	Fig 8-27	1
VS1-0440-002CN	1	JUMPER: SIG. GND TO FRAME GND	Fig. 8-27	3
VS3-0190-003CN	1	CONNECTOR, 3P FEMALE	Fig 8-3	30
VS3-0190-004CN	1	CONNECTOR, 4P FEMALE	Fig 8-3	32
VS9-0013-025CN	1	CAP, SERIAL I/O DUST	Fig 8-3	39
WD1-0222-000CN	1	DC POWER FUSE 250V/3.15A	Fig 8-24	2
WD1-0224-000CN	1	DC POWER FUSE 125V/6.3A	Fig 8-24	2
WS3-0976-000CN*	2	CONTACT	Fig 8-3A	31
WS3-1204-000CN	4	CONTACT	Fig 8-3	33
WS9-0104-000CN	1	CAP, CENTRONICS I/O DUST	Fig 8-3	40
WT2-0250-000CN	3	CLIP, CABLE	Fig 8-3	17
XA9-0267-000CN	n/a	SCREW, PL WASH-HD PHIL. (M3x6)	Fig 8-0	n/a
XA9-0389-000CN	n/a	SCREW, PL PHIL. M3x8 W/STAR WASH	Fig 8-0	n/a
XA9-0342-000CN	10	SCREW, STEPPED M3	Fig 8-3	15
XA9-0375-000CN	4	SCREW, M3x25	Fig 8-12	40
XB4-7300-609CN	n/a	SCREW, BLACK SELF-TAPPING PHILLIPS M3x6	Table 8-0	n/a
XB4-7401-009CN	n/a	SCREW, BLACK SELF-TAPPING PHILLIPS M4x10	Table 8-0	n/a
XB6-7300-609CN	n/a	SCREW, BLACK WASHER HEAD PHILLIPS MACHINE M3x6	Table 8-0	n/a
XB6-7300-809CN	n/a	SCREW, COATED (BLACK) WASHER HEAD PHILLIPS MACHINE M3x8	Table 8-0	n/a
XG3-6010-303CN	1	BEARING, BALL	Fig 8-12	35
*HP 33440 only. **HP 33449 only.				

YOUR ROAD MAP TO SETTING UP YOUR LASERJET SERIES II PRINTER

This appendix contains the complete text of the pamphlet, *Your Road Map to setting up Your LaserJet series II Printer* (P/N33440-90004), except for the title page. After November 1989, this pamphlet was packed with the LaserJet series II (HP 33440) printer. It replaced the *LaserJet series II Getting Started Manual*.

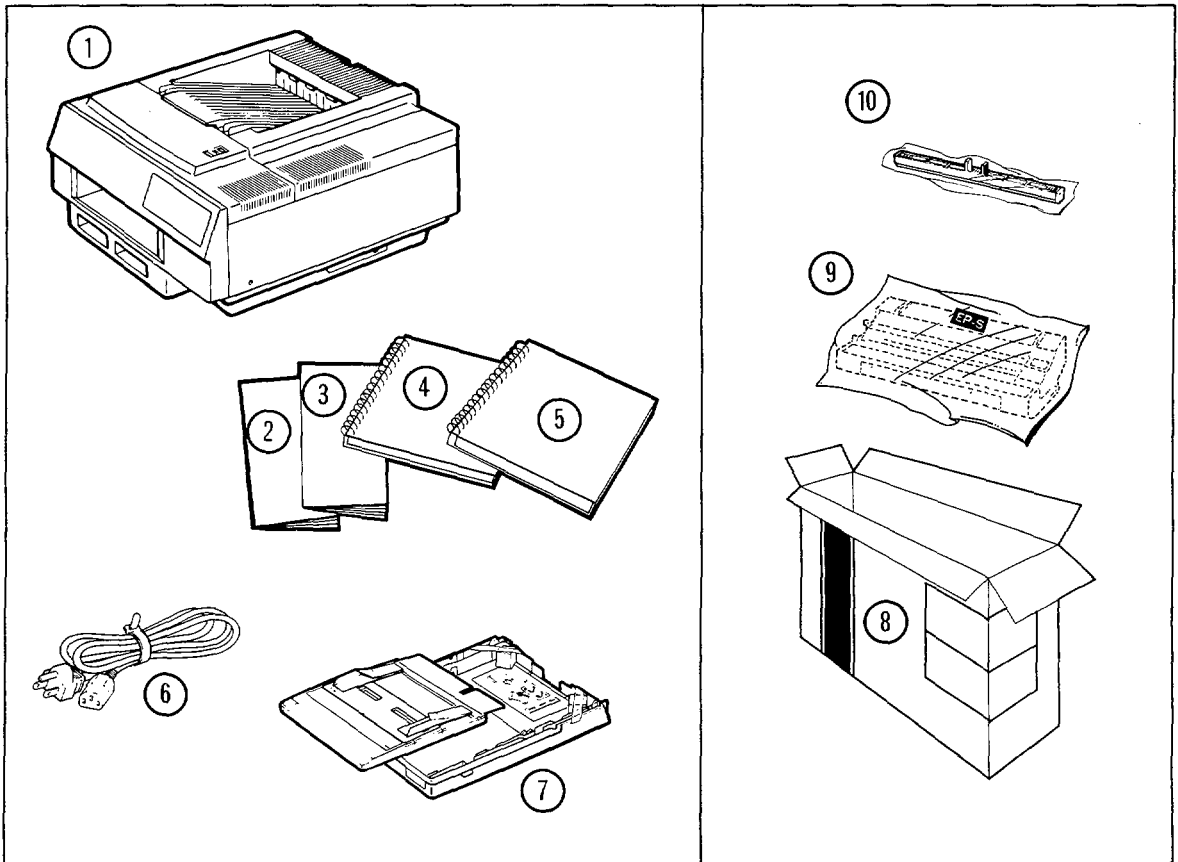
A Start Here



☐ Get help to lift the printer from the box.

Locate each item in the checklist below:

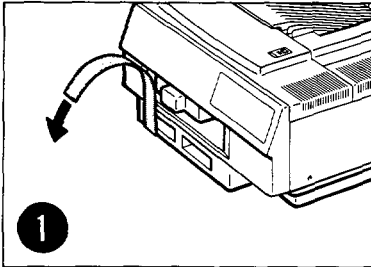
- ☐ 1. LaserJet series II printer
- ☐ 2. *LaserJet series II Printer User's Manual*
- ☐ 3. *LaserJet series II Printer Software Application Notes*
- ☐ 4. *LaserJet series II Printer Technical Quick Reference Guide*
- ☐ 5. *LaserJet series II Printer User's Quick Reference Guide*
- ☐ 6. Power cord
- ☐ 7. Paper tray
- ☐ 8. EP-S cartridge package
- ☐ 9. EP-S cartridge
- ☐ 10. Cleaning pad



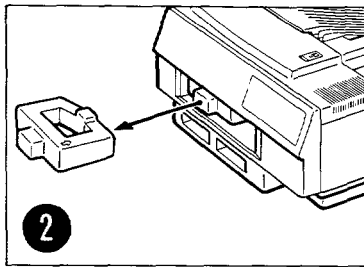
Notify your Hewlett-Packard Dealer immediately if any parts are missing or damaged.

B Unpack Your Printer

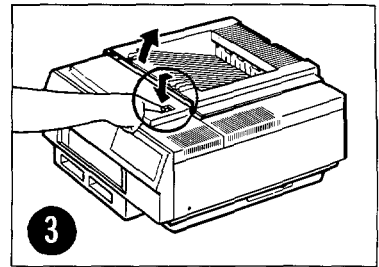
Check each box as you complete the step. ☒



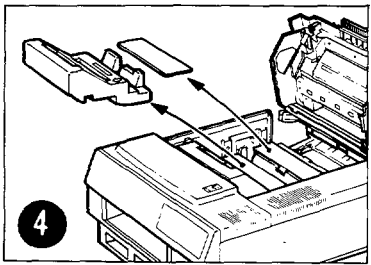
☐ Remove the front packing tape.



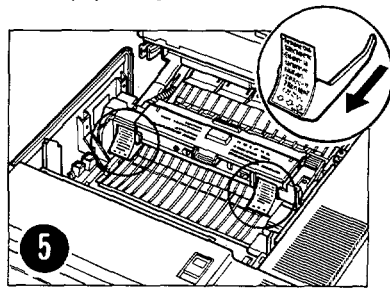
☐ Remove the packing foam from the paper tray slot.



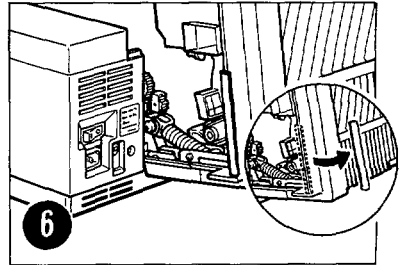
☐ Open the printer to the fully open position.



☐ Remove the packing foam from inside the printer.



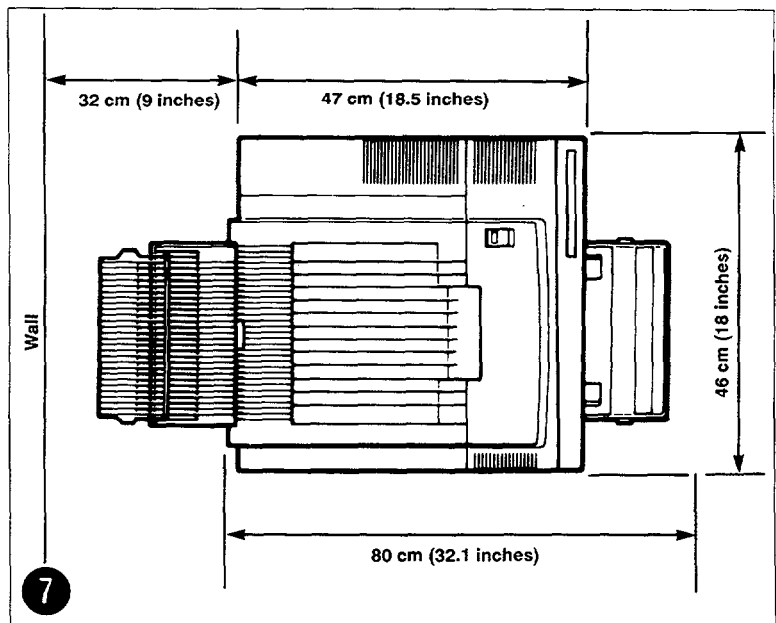
☐ Remove the fuser assembly spacers.



☐ Remove the top cover packing spacer.

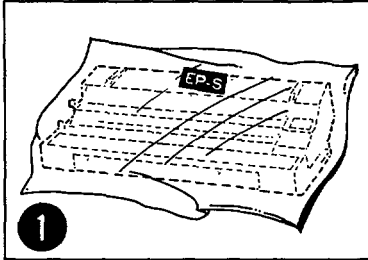
Your Location Requirements Are:

- An area with space around the printer as shown at the right
- A well-ventilated room
- Room temperature of 50° to 90.5° F
- Relative humidity of 20% to 80%
- A stable environment—no abrupt temperature or humidity changes
- No exposure to chemicals or direct sunlight
- A sturdy, level surface
- Line voltage that does not vary more than $\pm 10\%$ from that on printer's nameplate

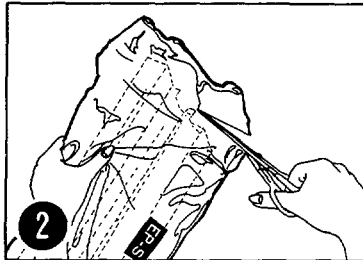


Install the EP-S Cartridge

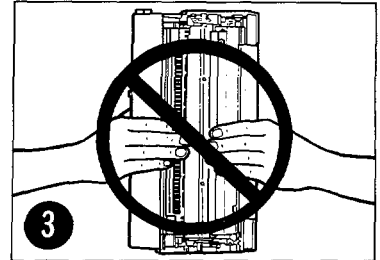
CAUTION: Make sure that you have removed all of the packing material.



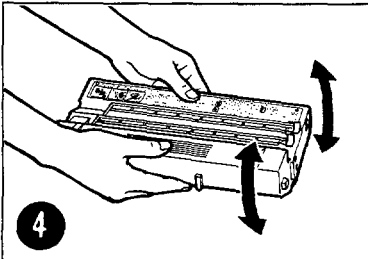
- ☐ Locate the EP-S cartridge.



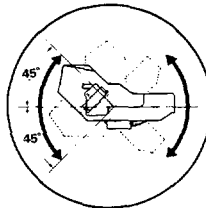
- ☐ Remove the EP-S cartridge from its bag.



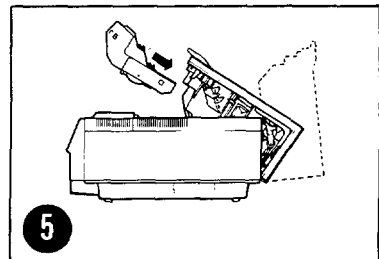
- ☐ Do not stand the EP-S cartridge on end.



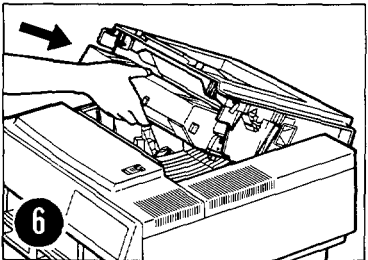
- ☐ Slowly rock the EP-S cartridge five to six times, in the direction shown, to distribute the toner.



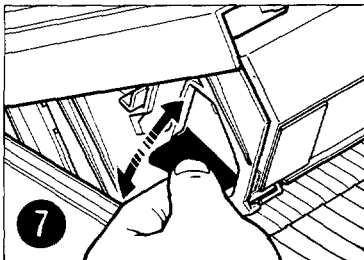
End View



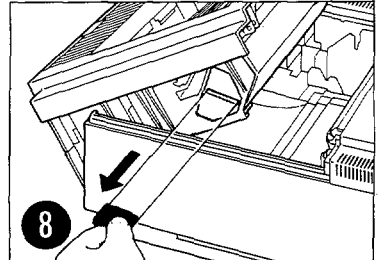
- ☐ Open the printer to the half-open position.



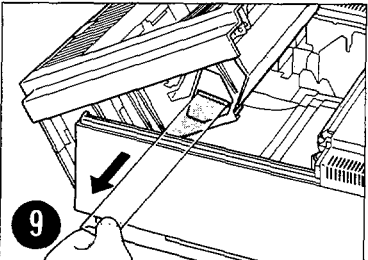
- ☐ Slide the EP-S cartridge into the top of the printer.



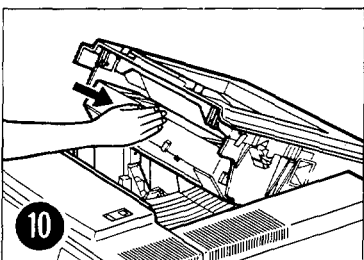
- ☐ Bend tab on left side of EP-S cartridge back and forth until it separates from the cartridge.



- ☐ Pull the tab straight out and away from the printer to remove the sealing tape.



- ☐ If the tab separates from the tape, pull out the tape.

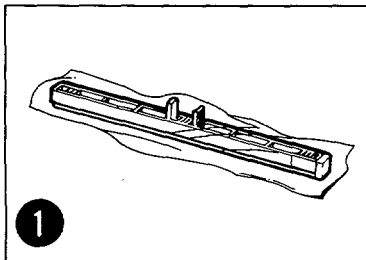


- ☐ Push firmly to be sure the EP-S cartridge is seated properly in the printer.

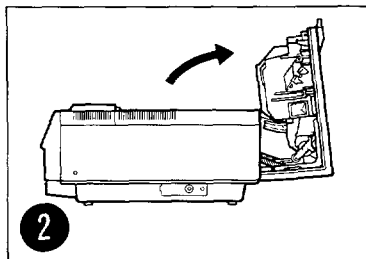
You're doing great!
Now go to section

D

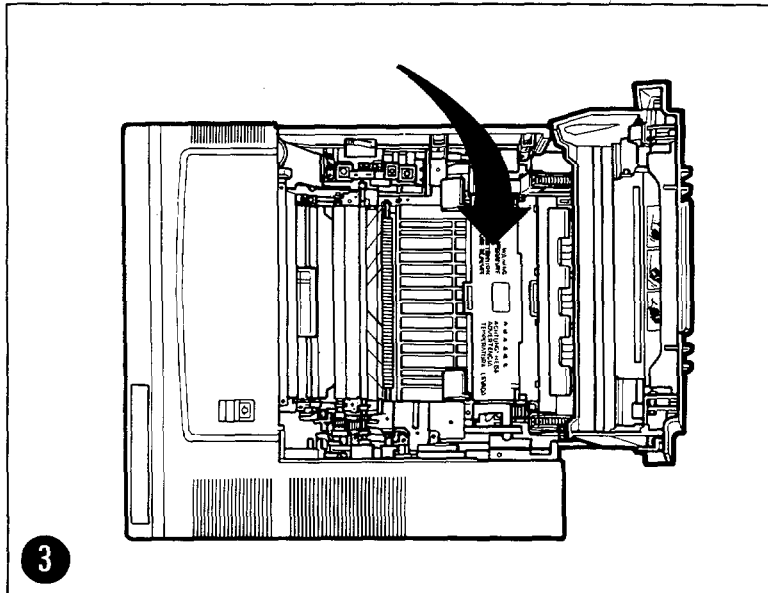
D Insert the Cleaning Pad



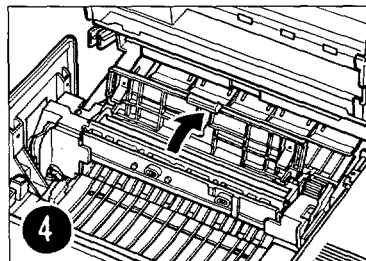
- ☐ Locate the cleaning pad and remove it from its plastic bag.



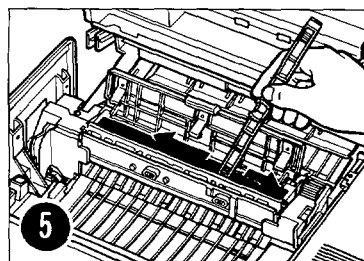
- ☐ Open the printer to the fully open position.



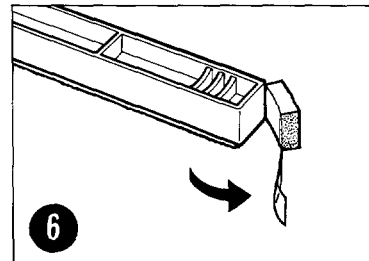
- ☐ Locate the fuser assembly.



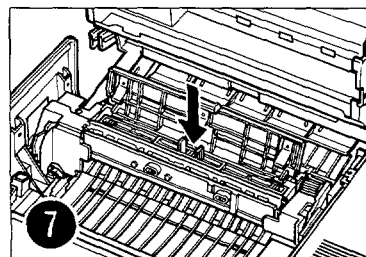
- ☐ Open the fuser assembly cover.



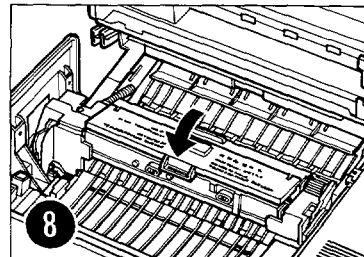
- ☐ Use the felt tip on the end of the cleaning pad to wipe the fuser assembly roller.



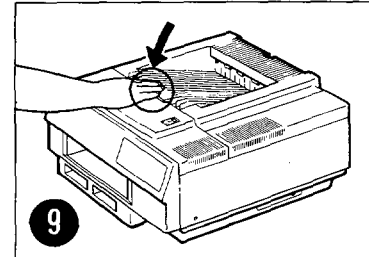
- ☐ Remove and discard the felt tip from the cleaning pad.



- ☐ Place the cleaning pad on the fuser assembly roller.

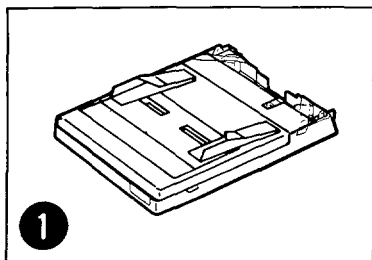


- ☐ Close the fuser assembly cover. The cover is slightly ajar when fully closed.

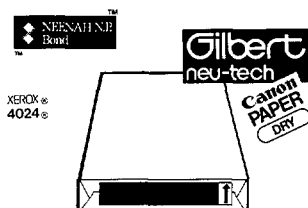


- ☐ Close the printer.

E Load the Paper



- ☐ Locate the paper tray.



Hewlett-Packard has tested Canon Dry Paper™, Xerox 4024®, Gilbert Neu-Tech™ and Neenah NP™ and found the results satisfactory. If in doubt, use one of the recommended papers.

Paper Specifications

The HP LaserJet series II works well with most types of paper. To ensure the best print quality and most reliable printer performance, use paper and other media that meet the specifications below.

Paper

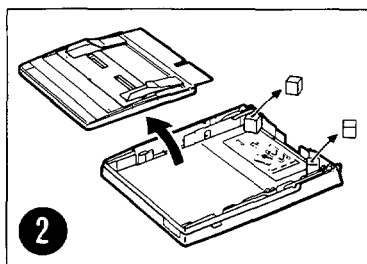
Must not scorch, melt, offset, or release hazardous emissions when heated to 200°C (392°F) for 0.1 second.

Must have 4% to 6% moisture content.

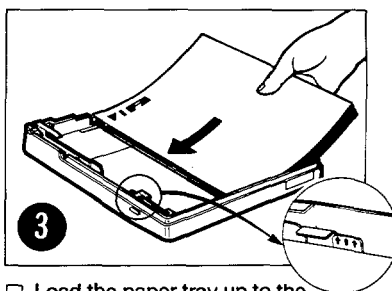
Must be packaged in moisture-proof ream wrap.

Paper, Top Input

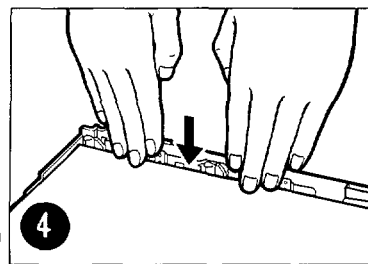
16 to 36 pound (60 to 135 g/M²)



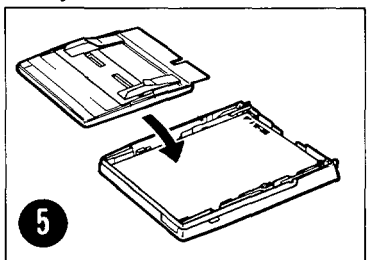
- ☐ Remove the cover and all packing material from inside the tray.



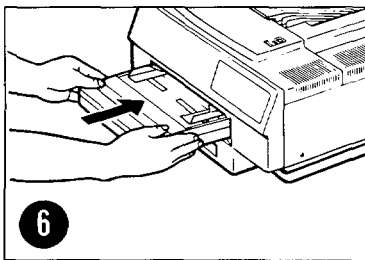
- ☐ Load the paper tray up to the limit tabs (about 200 sheets).



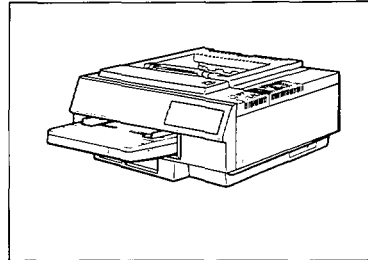
- ☐ Ensure that the paper is flat in the tray at all four corners.



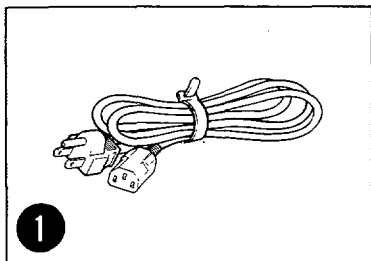
- ☐ Replace the tray cover.



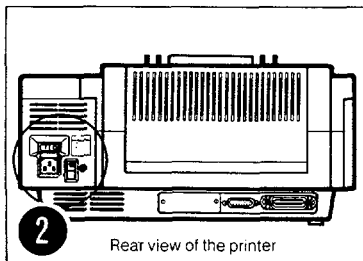
- ☐ Firmly insert the paper tray in the printer.



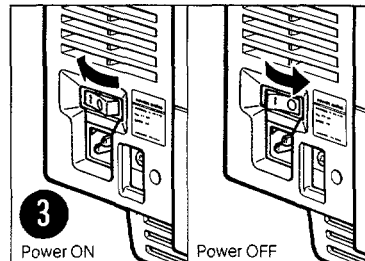
F Connect the Printer to a Power Supply



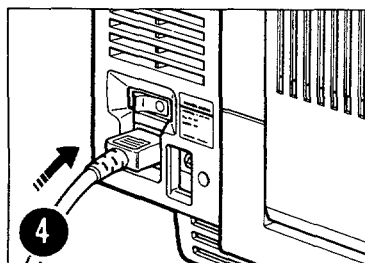
- ☐ Locate the power cord.



- ☐ Locate the power switch on the back of the printer.



- ☐ Make sure the power switch is in the off position.

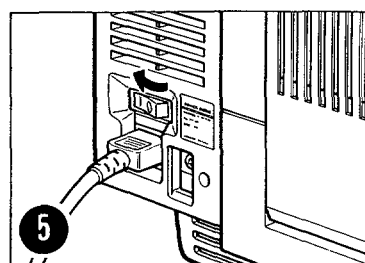


- ☐ Plug the power cord into the receptacle on the back of the printer.



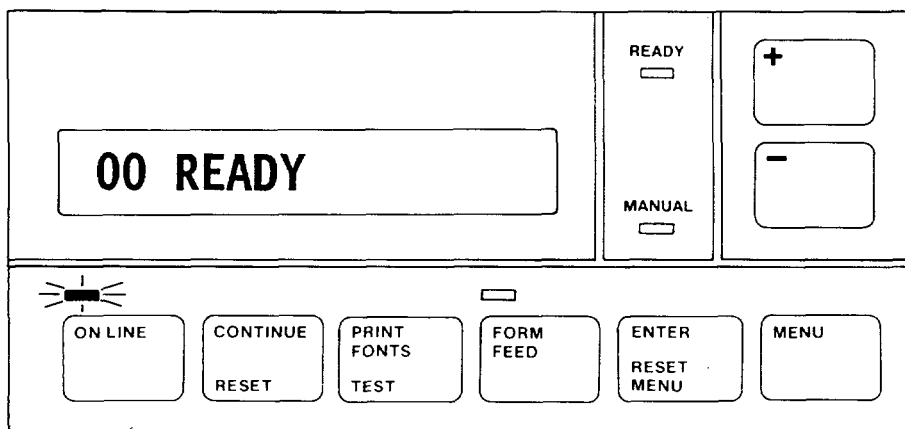
CAUTION

Make sure you plug the other end of the power cord into a 120-volt AC power outlet



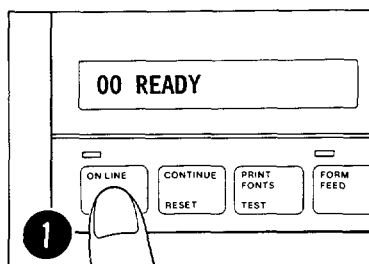
- ☐ Turn on your printer.

Printer Control Panel

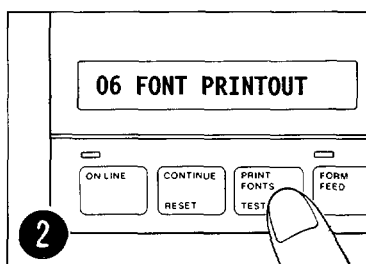


- ☐ Make sure the READY and ON LINE indicators are lit and the display window shows 00 READY.

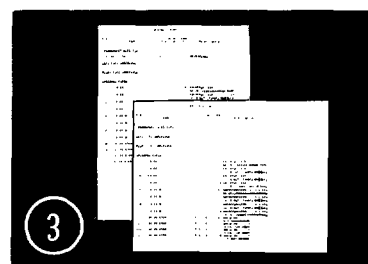
G Test the Printer Operation



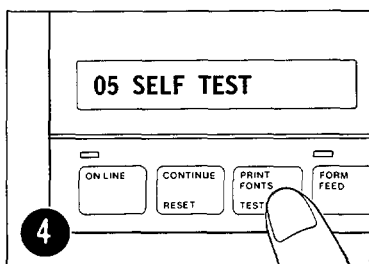
- ☐ Press the ON LINE key. (The ON LINE indicator goes out.)



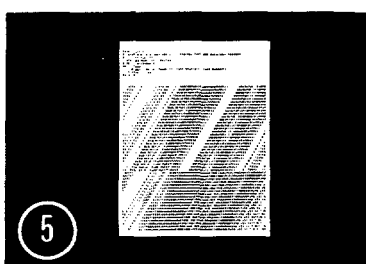
- ☐ Press and release the PRINT FONTS/TEST key.



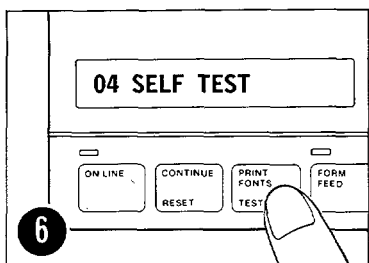
- ☐ Font samples for the internal fonts are printed.



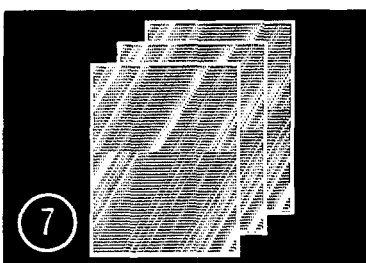
- ☐ Hold the PRINT FONTS key 2 seconds until 05 SELF TEST appears in the display window.



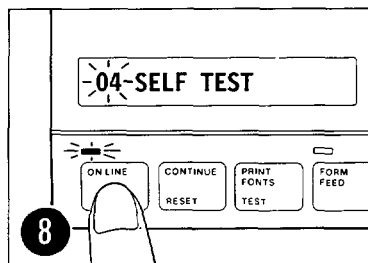
- ☐ A one-page self-test is printed.



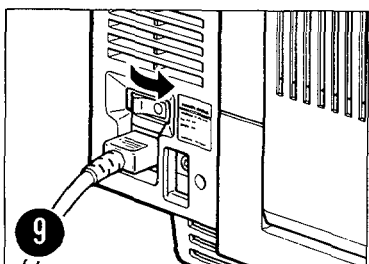
- ☐ Hold down the PRINT FONTS key 7 seconds until 04 SELF TEST appears in the display window.



- ☐ A continuous self-test is printed.

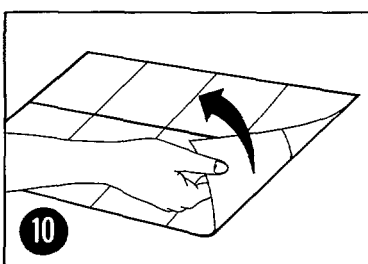


- ☐ Press the ON LINE key to stop continuous self-test. Printing stops shortly after you press ON LINE.



- ☐ When printing stops, turn off the printer.

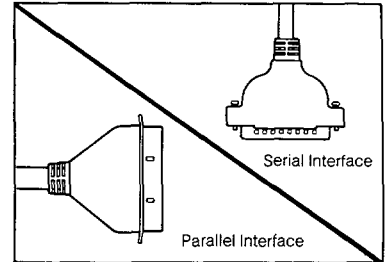
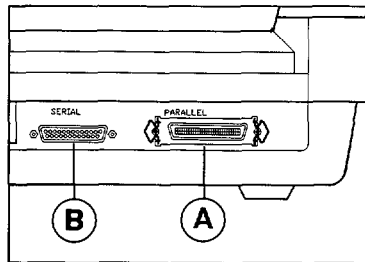
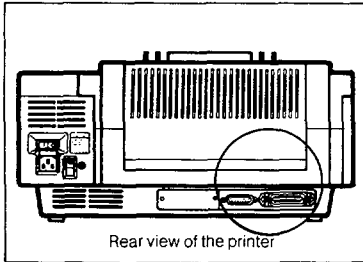
**GOOD JOB! YOU'RE NOW
READY TO CONNECT YOUR
PRINTER TO YOUR
COMPUTER!**



- ☐ Turn this Road Map over and continue with

H

H Choose a Parallel or Serial Interface



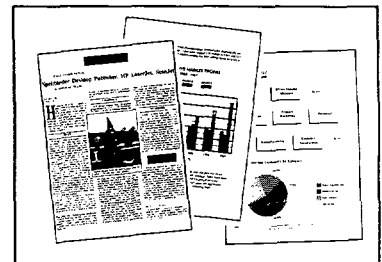
NOTE - ENSURE PRINTER AND PC ARE TURNED "OFF" BEFORE CONNECTING CABLES

Your printer communicates with your computer through an interface. Your LaserJet series II provides both parallel and serial interfaces. The interface connections are on the back of your printer.

A Use a parallel interface when:

- Your printer is less than 10 feet from your computer.
- You send primarily graphic information or soft fonts to the printer.
- Your computer does not have an available serial interface.

Did you decide on a parallel interface? Go to **I**

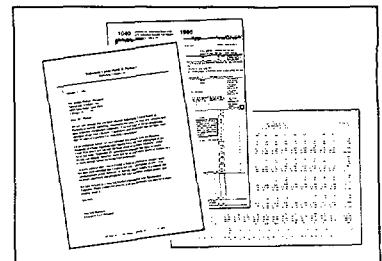


Graphical Information

B Use a serial interface when:

- Your printer must be more than 10 feet from your computer.
- Your computer does not have an available parallel interface.

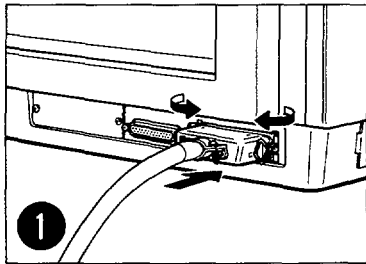
Did you decide on a serial interface? Go to **J**



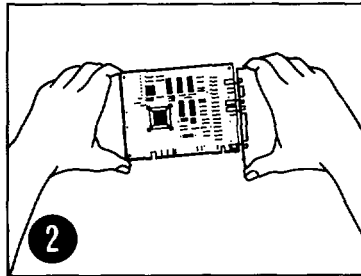
Textual Information

I Set Up to Use a Parallel Interface

The following setup information applies to MS-DOS-based computers; Hewlett-Packard has not tested other operating systems. If you have an operating system other than MS-DOS, contact your computer dealer for information.




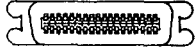
☐ Use clips to attach parallel cable.



☐ Install the interface card for your computer, if required.*




Make sure both your computer and printer are turned off, and then plug the cable into your computer and your printer. Use the clips to attach the cable to your printer. Note into which parallel port on your computer (LPT1 or LPT2) you plug the cable; you will need this information later.

*If you need a parallel interface for your HP Vectra, order HP part number HP24540A. If you have a different type of computer, contact your local dealer for information.

Computers	Computer End	Parallel Cable	Printer End
HP Vectra IBM PC/AT/XT/PS2 Compaq AT&T 3	 25 Pin Male	HP Part# _____ Length _____ HP92284A 6.6' (2.0 m)	 36 Pin Male

☐ Choose the right cable for your computer.

Configure the Control Panel for a Parallel Interface

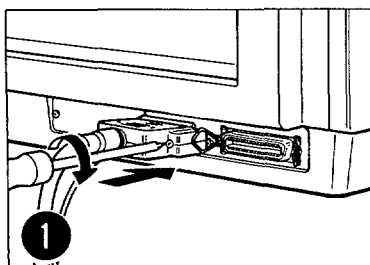
Step	Press	Printer Displays (If not, press  or  until it does, and then press  .)
1	ON LINE	00 READY (The ON LINE indicator goes out.)
2	MENU (Hold down for approximately 7 seconds.)	SYM SET=ROMAN-8*
3	MENU	AUTO CONT=OFF* (or ON*)
4	MENU	I/O=SERIAL*
5	+ (Plus)	I/O=PARALLEL
6	ENTER	I/O=PARALLEL*
7	ON LINE	00 READY (The ON LINE indicator lights.)

*Indicates the current default.

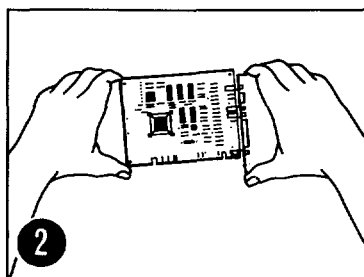
Now go to **L**

J Set Up to Use a Serial Interface

The following setup information applies to MS-DOS-based computers; Hewlett-Packard has not tested other operating systems. If you have an operating system other than MS-DOS, contact your computer dealer for information.



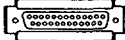


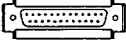


☐ Use a screwdriver to attach serial cable.



☐ Install the interface card for your computer, if required.*

Make sure both your computer and printer are turned off, and then plug the cable into your computer and your printer. Use a small screwdriver to attach the cable to the printer. Note into which serial port on your computer (COM1 or COM2) you plug the cable; you will need this information later.

*If you need a serial interface for your HP Vectra, order HP part number HP24540A or HP24541A for the dual serial option. If you have a different type of computer, contact your local dealer for information.




Computers	Computer End	Serial RS232 Cable		Printer End
IBM PC, PC/XT/PS 2 & IBM Compatibles Compaq Portable AT&T	 25 Pin Female	HP Part#	Length	 25 Pin Male
		HP-17255D HP-92219J	3.9' (1.2 m) 16.7' (5.0 m)	
HP Vectra IBM PC/AT & IBM Compatibles Compaq Deskpro 286/386	 9 Pin Female	HP Part#	Length	 25 Pin Male
		HP24542G	9.9' (3.0 m)	
HP Vectra (Dual Serial Card) 3	 25 Pin Male	HP Part#	Length	 25 Pin Male
		HP17255M HP13242-60010	3.9' (1.2 m) 16.7' (5.0 m)	

☐ Choose the right cable for your computer.

Now go to **K**

If you are going to use a serial RS-422 cable, see Appendix E, "Interfaces," in the LaserJet series II User's Manual.

K Configure the Control Panel for a Serial Interface

Step	Press	Printer Displays (If not, press  or  until it does, and then press  .)
1	ON LINE	00 READY (The ON LINE indicator goes out.)
2	MENU (Hold down for approximately 7 seconds.)	SYM SET=ROMAN-8*
3	MENU	AUTO CONT=OFF* (or ON*)
4	MENU	I/O=SERIAL*
* 5	MENU	SERIAL=RS-232*
6	ENTER	BAUD RATE=9600*
7	MENU	ROBUST XON=ON*
8	MENU	DTR POLARITY=HI*
9	ON LINE	00 READY (The ON LINE indicator lights.)

*Indicates the current default.

Now go to **L**

Note * This does not apply to the HP 33440. Switches must be set. See Chapter 3, page 3-5.



**OKAY! GOOD WORK! YOU'RE NOW
READY TO PREPARE YOUR PRINTER
TO TALK TO YOUR COMPUTER!**

Create or Edit your AUTOEXEC.BAT File

The following procedure:

- Puts into a file called AUTOEXEC.BAT the instructions your computer needs to be able to talk to the printer.
- Uses the EDLIN editor that comes with DOS.
- Works with either MS-DOS or PC-DOS operating systems. Most IBM and IBM-compatible computers use one of these operating systems. If your computer does not use either MS-DOS or PC-DOS, contact your computer dealer for configuration instructions.




Step	What to Do	How to Do It (Type the command in this procedure and press the Return key, as indicated by ↵.)
1	Turn on your computer.	
2	Turn on your printer.	
3	Make sure you are in the root directory of the disk from which you boot your computer.	CD\ ↵
4	Check to see if the AUTOEXEC.BAT file appears in the listing.	DIR AUTOEXEC.BAT ↵
5	If the message "File not found" appears, go to step 7.	
6	Make a backup copy of your existing AUTOEXEC.BAT file. Name it AUTOEXEC.SAV.*	COPY AUTOEXEC.BAT AUTOEXEC.SAV ↵
7	Look for the files MODE.COM and EDLIN.COM in your root directory.**	DIR *.COM ↵
8	If MODE.COM and EDLIN.COM appear in the directory listing, go to M.	
9	If MODE.COM and EDLIN.COM do not appear in the directory listing, copy them from your DOS disks to your root directory.	Place your DOS disk in drive A and type the following commands: COPY A:MODE.COM ↵ COPY A:EDLIN.COM ↵
10	Go to M	








*If you need to recover your original AUTOEXEC.BAT file later, type: COPY AUTOEXEC.SAV AUTOEXEC.BAT

**MODE.COM and EDLIN.COM are on your original DOS disks. If you have a hard disk, these files may be in a subdirectory.



M Prepare Your Computer to Talk to the Printer

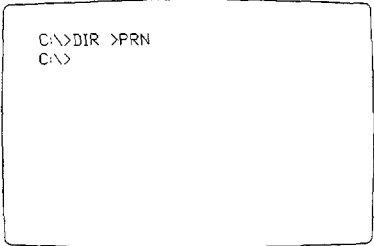
Type EDLIN AUTOEXEC.BAT and press 

<p>C> EDLIN AUTOEXEC.BAT END OF INPUT FILE *</p> <p>If your computer screen looks like this, follow the instructions in this column.</p>	
Step	Action
1	List the file by typing L  at the * prompt.
2	Look for commands that begin with MODE. If there are none, go to the next column.
3	<p>Compare the existing MODE commands with the ones listed below for your configuration.</p> <p>Parallel: MODE LPT1:,,P Serial: MODE COM1:9600,N,8,1,P MODE LPT1:=COM1:</p> <p>(If you used LPT2 or COM2, substitute it for LPT1 or COM1.) If you have the correct MODE commands, go to step 5.</p>
4	<p>You must delete any other MODE commands for the port to which your printer is connected.</p> <p>Delete any other mode commands by typing the number of the line on which the command appears, and D. Then press . For example, if line 3 has another MODE command, type 3D and press  at the * prompt. Go to the next column.</p>
5	Reboot your computer by holding down the CTRL and ALT keys while pressing the DEL key to run your new AUTOEXEC.BAT file.

<p>C> EDLIN AUTOEXEC.BAT NEW FILE *</p> <p>If your screen looks like this, follow the instructions in this column. If you need help using EDLIN, see your DOS documentation.</p>	
Step	Action
1	Insert a new line at the beginning of the AUTOEXEC.BAT file by typing 1i and pressing  at the * prompt. The prompt 1: * appears.
2	<p>Type the MODE command listed below for your configuration.</p> <p>Parallel: MODE LPT1:,,P  Serial: MODE COM1:9600,N,8,1,P  MODE LPT1:=COM1: </p>
3	Stop inserting lines in the file by holding down the CTRL key and pressing C.
4	List the file by typing L and pressing  .
5	Check the lines you just added for typographical errors. To fix any errors, type the line number of the line containing the error and press  . Retype the line correctly and press  . List the file again and recheck it for errors. Make sure the lines are correct before you proceed.
6	Exit from EDLIN by holding down the CTRL key and pressing E. EDLIN saves your file automatically.

N Verify Communication Between MS-DOS[®] and Your Printer

1. Make sure your computer and printer are on, and your printer is on line.
2. At your MS-DOS prompt, type DIR >PRN and press  .
3. The LaserJet series II prints a list of the files on your disk.
4. The FORM FEED indicator lights to indicate that the printer received data. Press the ON LINE key and then press the FORM FEED key to eject the page.
5. Remember to press the ON LINE key to prepare your printer for more data.
6. If you are having trouble, go to .



```
C:\>DIR >PRN
C:\>
```

Congratulations!

You're Done!

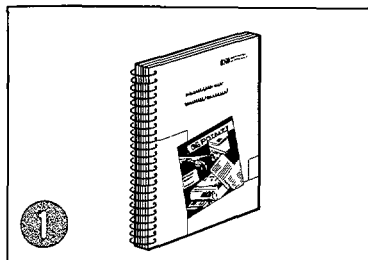
Now you can set up your software to work with your new LaserJet series II printer.

Refer to the LaserJet series II Printer Software Application Notes that came with your LaserJet series II.

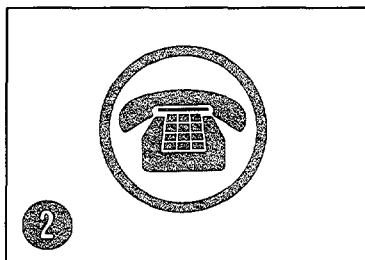
Having trouble?

- Was your computer or printer on when you connected your interface cable?
 - Turn off your computer and printer, wait 15 seconds, and turn them on again. Continue with **N**.
- Is the interface port configured correctly?
 - Your cable may not be connected to LPT1 for a parallel interface or COM1 for a serial interface. Try working through **L**, **M**, and **N** again substituting LPT2 if you have a parallel interface, or COM2 if you have a serial interface.
- Are all of the cables and power cords attached properly?
 - Check all of the connections.
- Is the ON LINE indicator on the printer control panel lit?
 - If not, press the ON LINE key.
- Is the printer working properly? Run the self-test described in **G**.
 - If necessary, call your HP Dealer or HP Sales Representative.
- Is your computer working properly?
 - Run an application that works.
 - If necessary, call your computer dealer or manufacturer.
- Have you setup the control panel properly?
 - Hold down the MENU key for about 7 seconds until the Configuration Menu appears in the display window. Then step through the configuration settings.
 - If necessary, repeat **I** for a parallel interface or **J** and **K** for a serial interface, and continue through the rest of this Road Map.
- Have you setup your AUTOEXEC.BAT file properly?
 - Type TYPE AUTOEXEC.BAT on your computer and press **↵**. Check the listing for errors in the line or lines you added.
 - If necessary, repeat **L**, **M**, and **N**.
- Do you have the correct printer cable?
 - Check **I** for a parallel interface or **J** and **K** for a serial interface.
 - If necessary, obtain the correct cable.

Consult your LaserJet series II User's Manual.

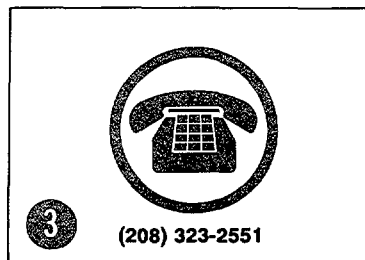


Call the HP Dealer from whom you purchased your LaserJet series II.



Enter your Dealer's number here:

Call Hewlett-Packard's Personal Peripherals Assist Line for help.

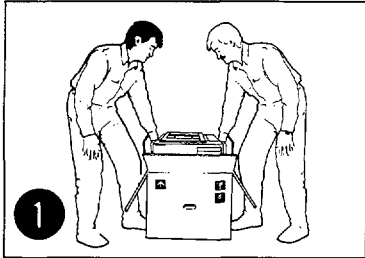


7:00 a.m. to 6:00 p.m. Mountain time
(7:00 a.m. to 4:00 p.m. Wednesday)

YOUR GUIDE TO SETTING UP YOUR LASERJET III PRINTER

This appendix contains the complete text of the pamphlet, *Your Guide to Setting up Your LaserJet III Printer* (P/N 33449-90905), except for the title page. This pamphlet is packed with the LaserJet III (HP 33449) printer.

Start here

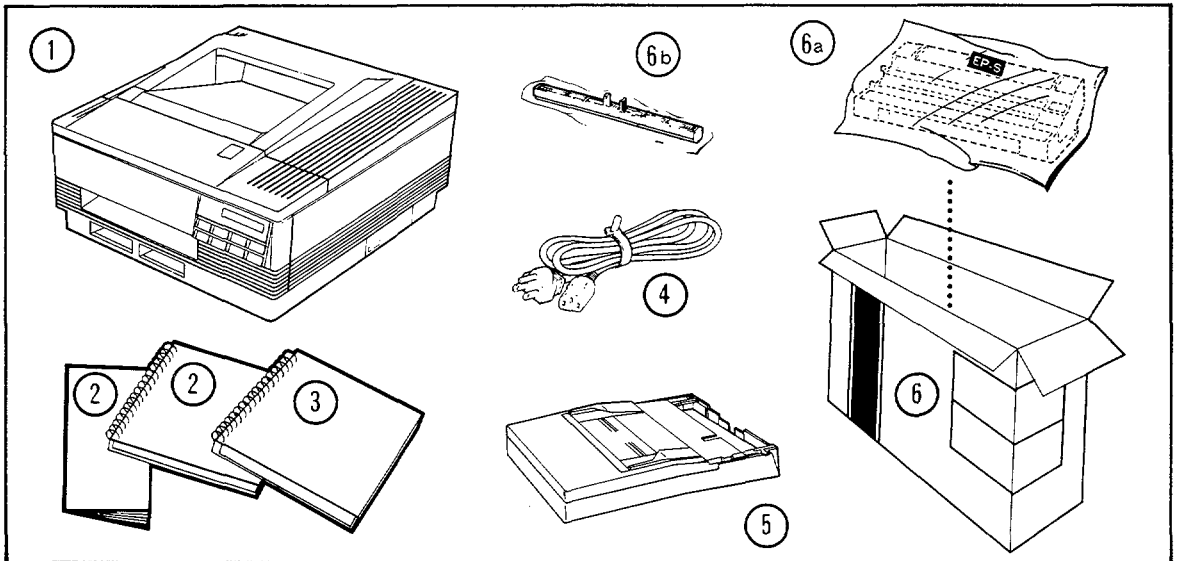


Locate each item in the checklist below:

- | | |
|---|--|
| <input type="checkbox"/> 1. LaserJet III printer | <input type="checkbox"/> 5. Paper tray |
| <input type="checkbox"/> 2. <i>LaserJet III Printer User's Manual and Quick Reference Guide</i> | <input type="checkbox"/> 6. EP-S cartridge package |
| <input type="checkbox"/> 3. <i>LaserJet III Printer Software Application Notes</i> | a. EP-S cartridge |
| <input type="checkbox"/> 4. Power cord | b. Cleaning pad |

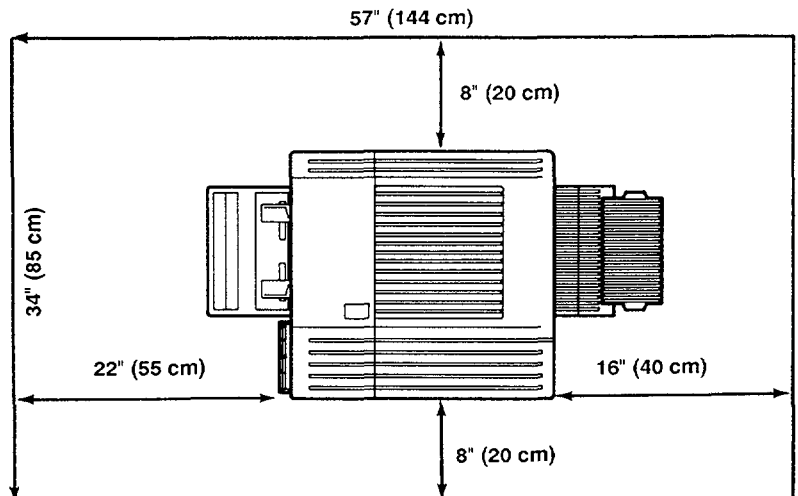
- ☐ Get help to lift the printer from the box. (The printer weighs 48 pounds.)

Notify your Hewlett-Packard Dealer immediately if any parts are missing or damaged.



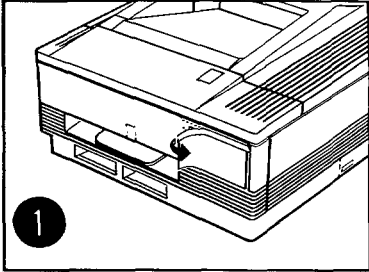
Minimum Location Requirements Are:

- An area with space around the printer as shown at the right
- A well-ventilated room
- Room temperature of 50° to 90.5° F
- Relative humidity between 20% and 80%
- A stable environment—no abrupt temperature or humidity changes
- No exposure to chemicals or direct sunlight
- A sturdy, level surface
- Line voltage that does not vary more than $\pm 10\%$ from that on printer's nameplate

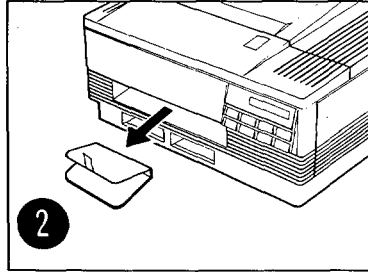


B Unpacking your Printer

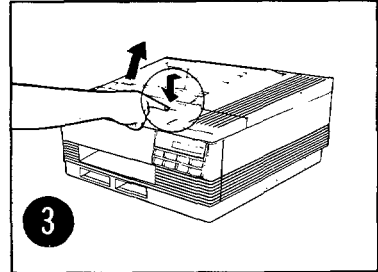
Check each box as you complete the step.



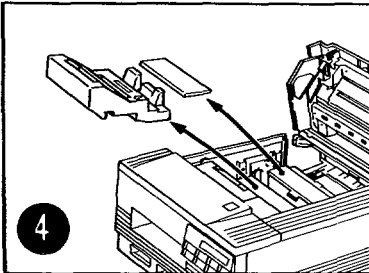
☐ Remove protective packing foam.



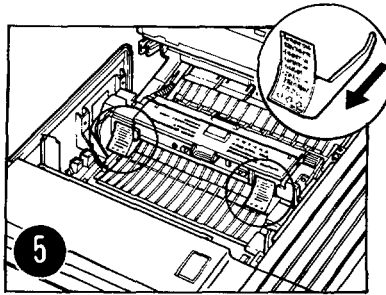
☐ Remove the packing foam from the paper tray slot.



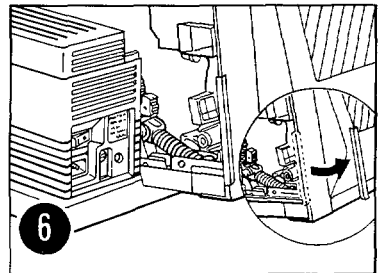
☐ Open the printer to the fully open position.



☐ Remove the packing foam from inside the printer.



☐ Remove the fuser assembly spacers.

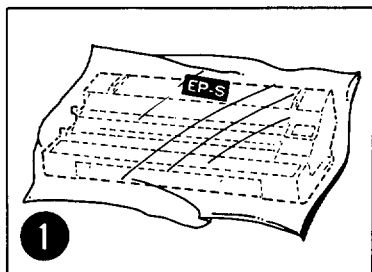


☐ (Rear View) Remove the top cover packing spacer.

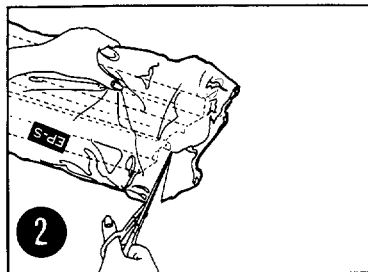
Installing the EP-S Cartridge



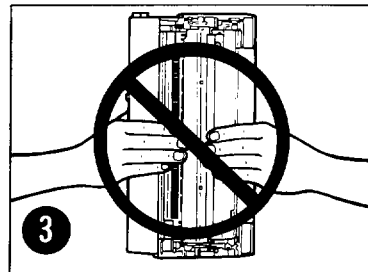
CAUTION: Make sure you have removed all of the printer packing material.



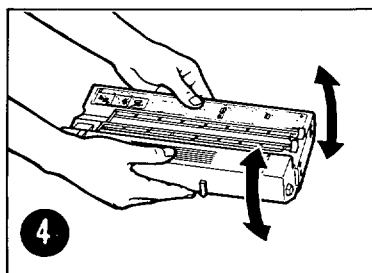
- ☐ Locate the EP-S cartridge. It is in a separate box that is included with your printer.



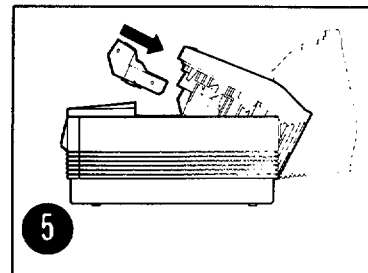
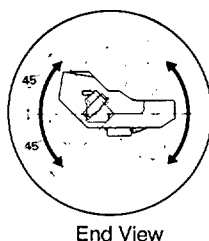
- ☐ Remove the EP-S cartridge from its bag.



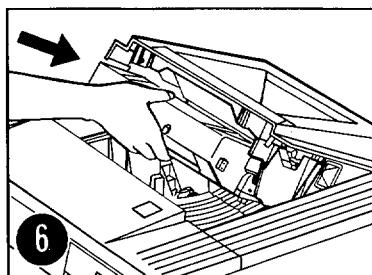
- ☐ Do not stand the EP-S cartridge on end.



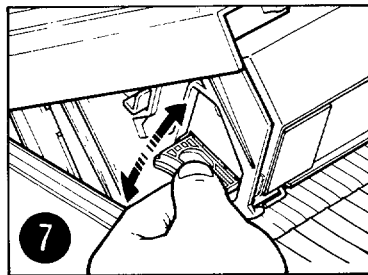
- ☐ Slowly rock the EP-S cartridge five to six times, in the direction shown, to distribute the toner.



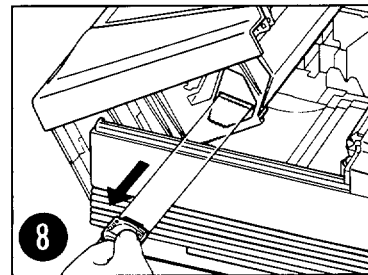
- ☐ Open the printer to the half-open position.



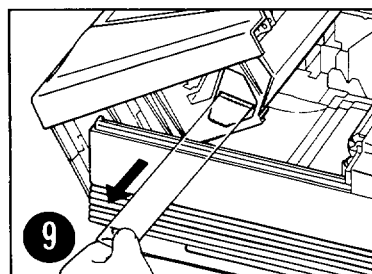
- ☐ Slide the EP-S cartridge into the top of the printer.



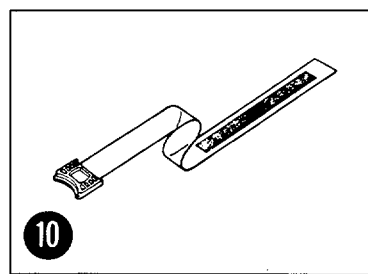
- ☐ Bend the tab on the left side of the EP-S cartridge back and forth until it separates from the cartridge.



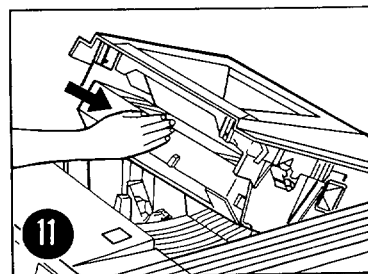
- ☐ Pull the tab straight out and away from the printer to remove the sealing tape.



- ☐ If the tab separates from the tape, pull out the tape.



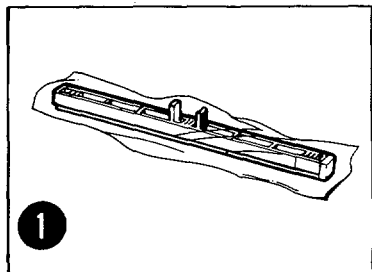
- ☐ Discard the sealing tape strip, which is about 22 inches (55 cm) long.



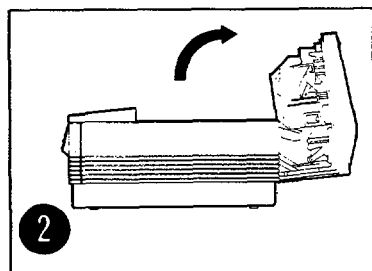
- ☐ Push firmly to be sure the EP-S cartridge is seated properly.

You're doing great! Now go to section D.

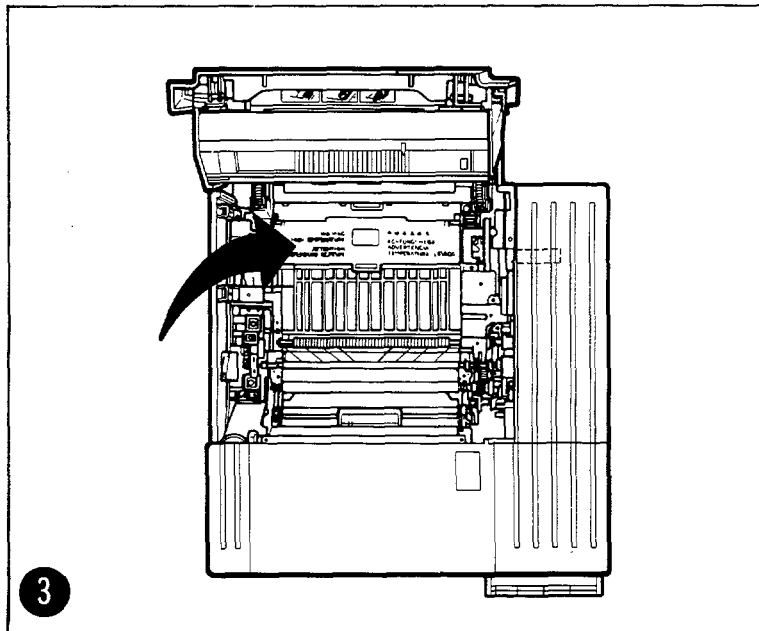
D Inserting the cleaning pad



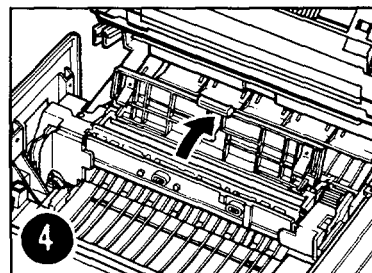
- ☐ Locate the cleaning pad and remove it from its plastic wrap.



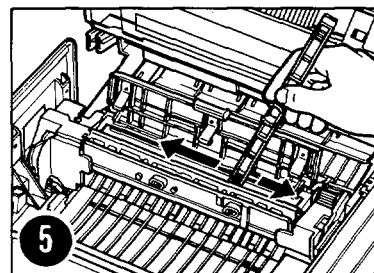
- ☐ Open the printer to the fully open position.



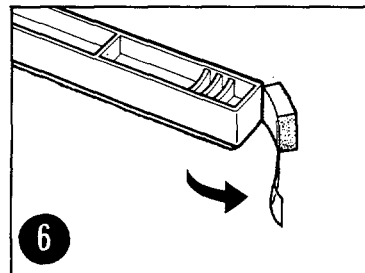
- ☐ Locate the fuser assembly. Identify the fuser assembly by green color and the **WARNING-HIGH TEMPERATURE** message. (It will not be hot until powered up.)



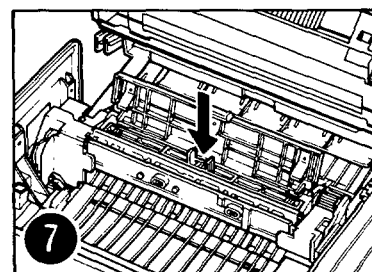
- ☐ Open the fuser assembly cover.



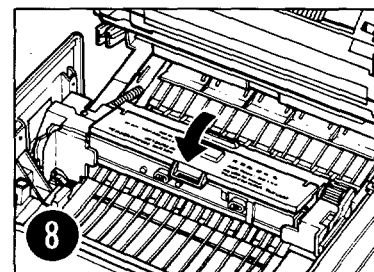
- ☐ Use the felt tip on the end of the cleaning pad to wipe the fuser assembly roller.



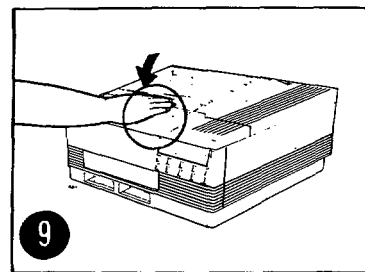
- ☐ Remove and discard the felt tip from the cleaning pad.



- ☐ Place the cleaning pad on the fuser assembly roller.



- ☐ Close the fuser assembly cover. The cover is slightly ajar when fully closed.



- ☐ Close the printer.

Loading the paper

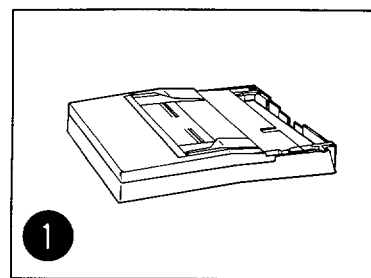


Paper Specifications

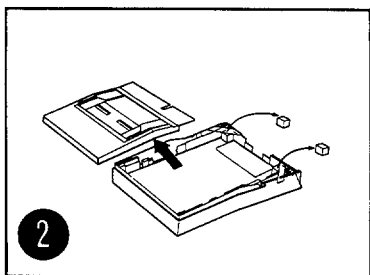
Your HP LaserJet III printer works well with many common papers, particularly xerographic bond papers with basis weights from 16 to 36 pounds (60 to 135 g/m²). However, we recommend you test a particular paper to determine if its performance is acceptable. Refer to Appendix D, "Paper and Print Media Specifications," in the LaserJet III Printer User's Manual.

NOTE

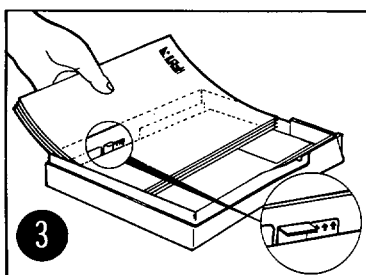
Hewlett-Packard neither warrants nor recommends the use of a particular paper. Paper properties are subject to change by paper manufacturers and Hewlett-Packard has no control over such changes. The customer assumes all responsibility as to the quality and performance of paper. Although testing helps to characterize performance, long-term satisfaction requires process quality control by the manufacturer, and proper handling until use.



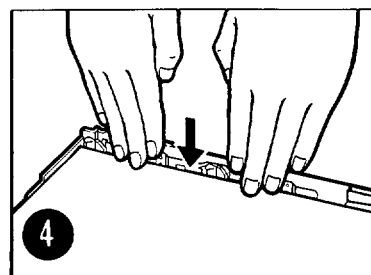
☐ Locate the paper tray.



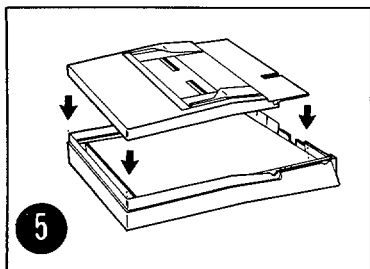
☐ Remove the cover and all packing material from inside the tray.



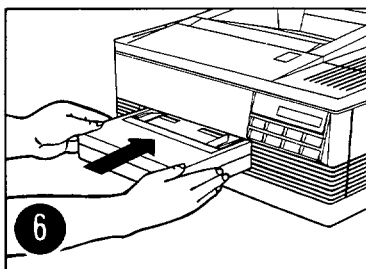
☐ Load the paper tray up to the limit tabs (about 200 sheets of 20 pound paper).



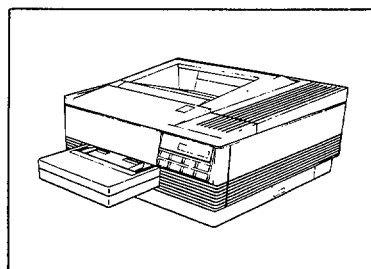
☐ Ensure that the paper is flat in the tray at all four corners.



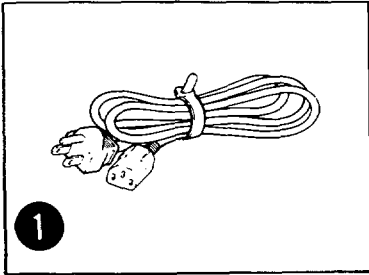
☐ Replace the tray cover.



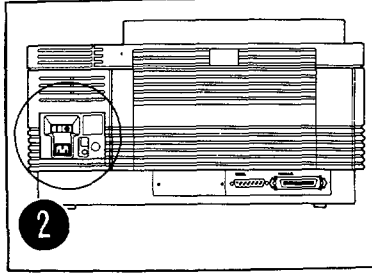
☐ Firmly insert the paper tray in the printer.



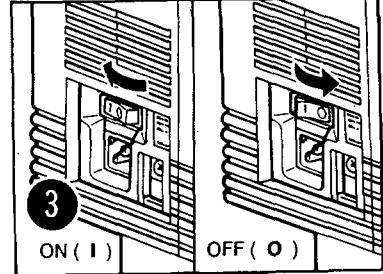
F Connecting the printer to a power supply



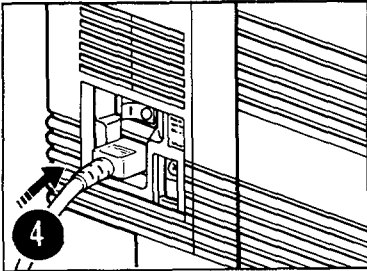
- ☐ Locate the power cord.



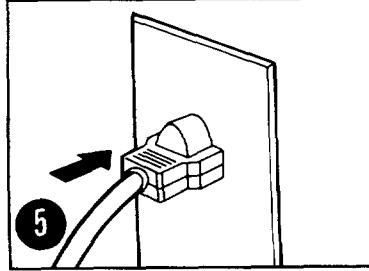
- ☐ (Rear View) Locate the power switch on the back of the printer.



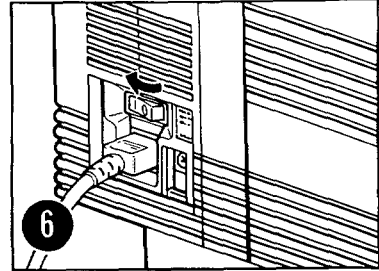
- ☐ Make sure the power switch is in the OFF (O) position.



- ☐ Plug the power cord into the receptacle on the back of the printer.

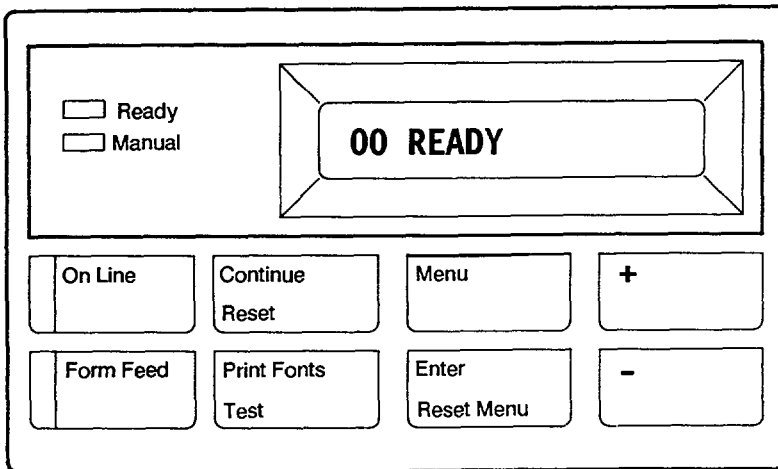


- ☐ **CAUTION** Make sure you plug the other end of the power cord only into a 120-volt AC power outlet.



- ☐ Turn on your printer. 05 SELF TEST will appear momentarily in the display window. The self test will last approximately 30 seconds.

Printer Control Panel



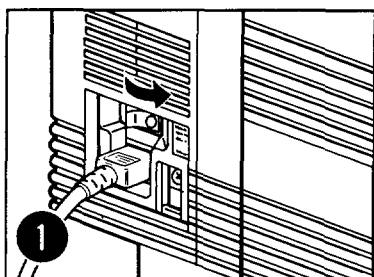
7

- ☐ Make sure the **Ready** and **On Line** indicators are lit and the display window shows 00 READY.

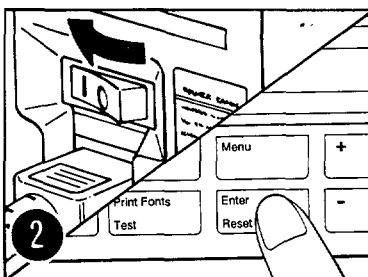
Choosing the display message language



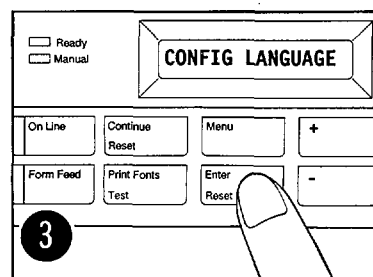
If you want your control panel messages displayed in English, go on to Section H. If you want them in French, German, Italian, or Spanish, do the following:



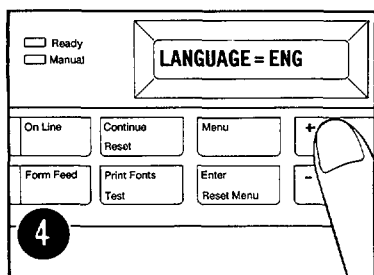
□ Turn the printer off.



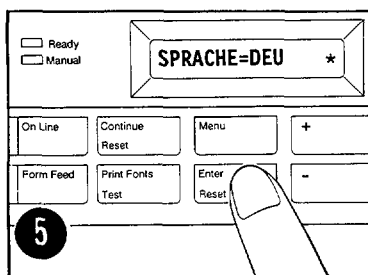
□ Hold the **Enter** key while turning the printer back on.



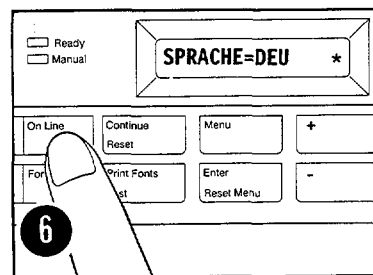
□ Wait until **CONFIG LANGUAGE** appears. Release **Enter** key. **05 SELF TEST** appears.



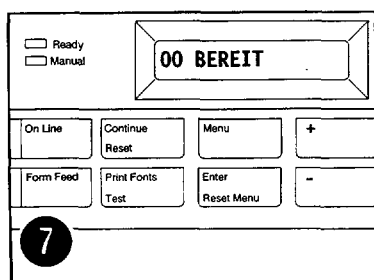
□ Wait for **LANGUAGE = ENG** to appear. Press the **+** key to choose your language.



□ Press the **Enter** key to save your choice. An asterisk (*) will appear beside your language selection.



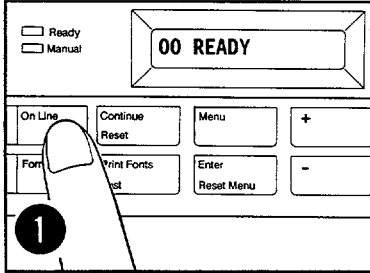
□ Press the **On Line** key. The **On Line** indicator light will come on.



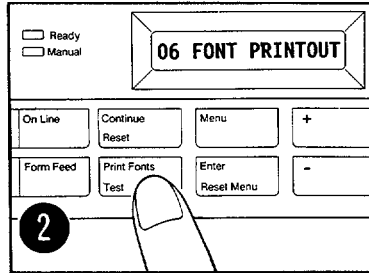
□ Your display messages will now be in the language you selected.



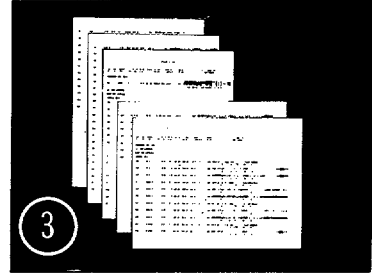
Testing the printer operation



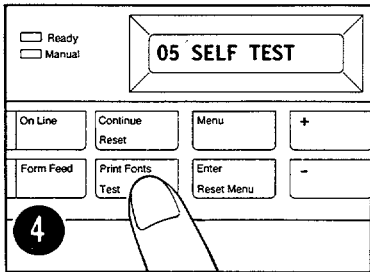
- ☐ Press the **On Line** key once to take the printer off-line again. (The **On Line** indicator goes out.)



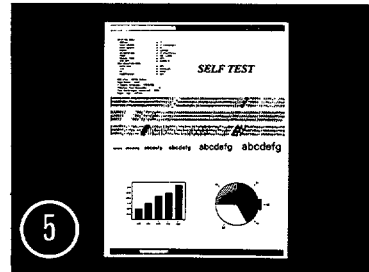
- ☐ Briefly Press and release the **Print Fonts/Test** key.



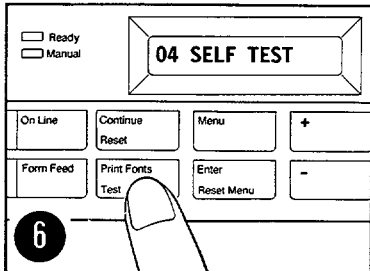
- ☐ Font samples for the printer's internal fonts are printed.



- ☐ Hold down **Print Fonts** key 3 seconds until 05 SELF TEST appears in display window, then release.



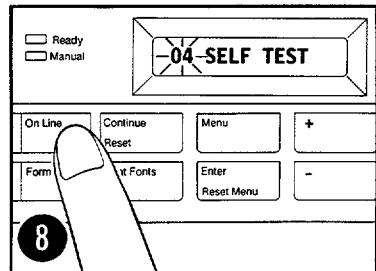
- ☐ After about 30 seconds a one page self-test is printed.



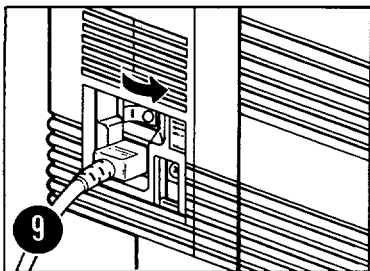
- ☐ Hold down the **Print Fonts** key for about 5 seconds until 04 SELF TEST appears in the display window.



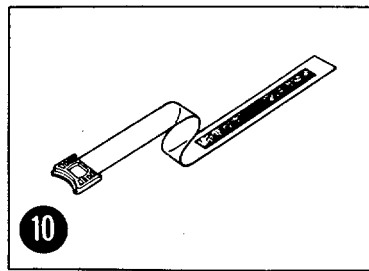
- ☐ After about 30 seconds a continuous self test begins printing. Now go to step 8.



- ☐ Press the **On Line** key to stop the continuous self test. 04 will flash. A few more pages will print before the printer returns **On Line**.



- ☐ When printing stops, turn off the printer.



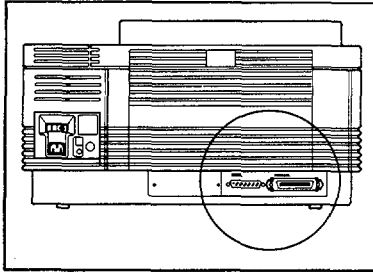
- ☐ **NOTE** If above samples did not print, make sure you've removed the sealing tape (Section C, steps 7-10).

If problems persist, retry the steps on this page. If problems still persist contact your internal support organization or your HP dealer.

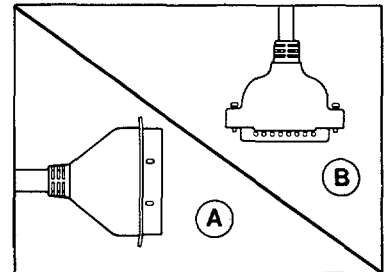
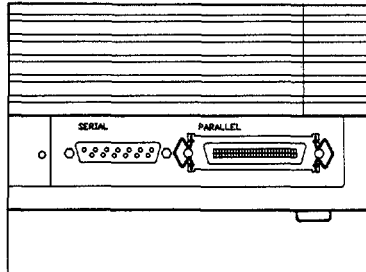
Choose a Centronics parallel or serial interface



Centronics parallel is the factory default. If you know you want to use a Centronics parallel interface, go to section **J**.



(Rear View)



NOTE: ENSURE PRINTER AND PC ARE TURNED "OFF" BEFORE CONNECTING THE CABLE.

Your printer communicates with your computer through an interface (sometimes called a "port") at each end. Refer to your PC's user documentation to determine the location and kinds of interfaces your PC has, or consult your dealer. Your LaserJet III printer provides both Centronics parallel and serial interfaces. The interface connections are on the back of your printer.

If your PC doesn't already have a Centronics parallel or serial interface, you may need to order and install a special interface card for your PC.

For the HP Vectra, the part numbers are:

Centronics parallel interface - HP24540B

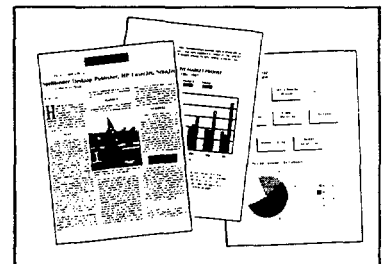
Serial interface - HP24541B

If you have a different type of computer, contact your dealer.





Use a Centronics parallel interface when:

- Your printer is less than 10 feet (3 meters) from your computer.
- You send primarily graphic information or soft fonts to the printer.
- Your computer does not have an available serial interface.



Graphic Information

A typical parallel cable looks like this:

Computers	Computer End	Parallel Cable	Printer End
HP Vectra IBM PC/AT/XT/PS2 Compaq AT&T	 25 Pin Male Plug	HP Part# <hr/> HP92284A	Length <hr/> 6.6' (2.0 m)
			 36 Pin Male Plug

☐ Choose the right cable for your computer.

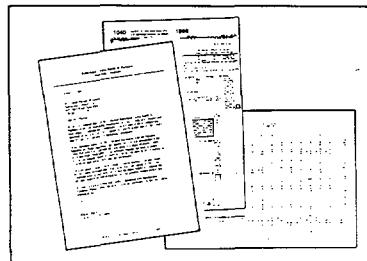
Did you decide on a Centronics parallel interface? If so, go to **J**.

I (continued)

B

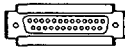

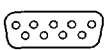

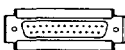

Use a serial interface when:

- Your printer must be more than 10 feet (3 meters) but less than 50 feet (15 meters) from your computer.
- Your computer does not have an available Centronics parallel interface.



Textual Information

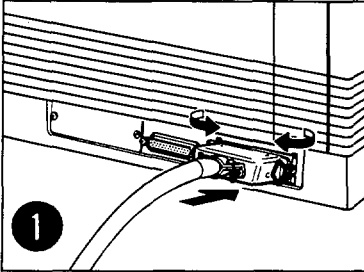
A typical serial cable looks like this:

Computers	Computer End	Serial RS232 Cable		Printer End
IBM PC, PC/XT/PS 2 & IBM Compatibles Compaq Portable AT&T	 25 Pin Female Plug	HP Part#	Length	 25 Pin Male Plug
		HP-17255D HP-92219J	3.9' (1.2 m) 16.7' (5.0 m)	
HP Vectra IBM PC/AT & IBM Compatibles Compaq Deskpro 286/386	 9 Pin Female Plug	HP Part#	Length	 25 Pin Male Plug
		HP24542G	9.9' (3.0 m)	
HP Vectra (Dual Serial Card)	 25 Pin Male Plug	HP Part#	Length	 25 Pin Male Plug
		HP17255M HP13242-60010	3.9' (1.2 m) 16.7' (5.0 m)	

☐ Choose the right cable for your computer.

Did you decide on a serial interface? If so, go to **K**.

Set up to use a Centronics parallel interface

J

Make sure both your computer and printer are turned off, and then plug the cable into your computer and your printer. Use the wire clips to attach the cable to your printer. Note into which parallel port on your computer (e.g., LPT1 or LPT2) you plug the cable; you will need this information later. When complete, turn your printer and your computer ON again.

- ☐ Use wire clips to attach Centronics parallel cable

Configure the control panel for a Centronics parallel interface

Follow these steps **Only** to verify the Centronics parallel configuration setting.

Step	Press	Printer Displays: (If not, press + or - until it does, and then press the Enter key.)
1	On Line	00 READY (The On Line indicator goes out.)
2	Menu (Hold down for approximately 5 seconds.)	AUTO CONT = OFF* †
3	Menu	I/O = PARALLEL* †
4	On Line	00 READY (The On Line indicator lights.)

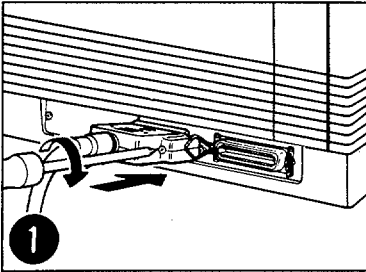
† Indicates the factory default.

2

Now go to **L**



Set up to use a serial interface



Make sure both your computer and printer are turned off, and then plug the cable into your computer and your printer. Use a small screwdriver (if necessary) to attach the cable to the printer. Note into which serial port on your computer (e.g., COM1 or COM2) you plug the cable; you will need this information later. When complete, turn your printer and your computer ON again.

- Attach the serial cable connector to the serial I/O port on the back of the printer. (You may need to use a small screwdriver).

Configure the control panel for a serial interface

Step	Press	Printer Displays: (If not, press + or - until it does, and then press the Enter key.)
1	On Line	00 READY (The On Line indicator goes out.)
2	Menu (Hold down for approximately 5 seconds.)	AUTO CONT = OFF* †
3	Menu	I/O = PARALLEL* †
4	+ (Plus) or - (Minus)	I/O = SERIAL
5	Enter	I/O = SERIAL*
6	Menu	SERIAL = RS-232* †
7	Menu	BAUD RATE = 9600* †
8	Menu	ROBUST XON = ON* †
9	Menu	DTR POLARITY = HI* †
10	On Line	00 READY (The On Line indicator lights.)

† Indicates the factory default.



If you are going to use serial RS-422 cable, refer to Appendix F, "Interfaces", in the LaserJet III User's Manual (P/N 33449-90901).

Create or edit your AUTOEXEC.BAT file

The following procedure:

- Puts the instructions your computer needs to be able to talk to the printer into a file called AUTOEXEC.BAT.
- Uses the EDLIN editor that comes with DOS.
- Works with either MS-DOS or PC-DOS operating systems. Most IBM and IBM-compatible computers use one of these operating systems. If your computer does not use either MS-DOS or PC-DOS, contact your computer dealer for configuration instructions.

Step	What to Do	How to Do It (Type the command in this procedure and press the Return key, as indicated by ↵.)
1	Turn on your printer.	
2	Turn on your computer.	
3	Make sure you are in the root directory of the disk from which you boot your computer.	CD\ ↵
4	Check to see if the AUTOEXEC.BAT file appears in the listing.	DIR AUTOEXEC.BAT ↵
5	If the message "File not found" appears, go to step 7.	
6	Make a backup copy of your existing AUTOEXEC.BAT file. Name it AUTOEXEC.SAV.*	COPY AUTOEXEC.BAT AUTOEXEC.SAV ↵
7	Look for the files MODE.COM and EDLIN.COM in your root directory.**	DIR *.COM ↵
8	If MODE.COM and EDLIN.COM appear in the directory listing, go to M .	
9	If MODE.COM and EDLIN.COM do not appear in the directory listing, copy them from your DOS disks to your root directory.	Place your DOS disk in drive A and type the following commands: COPY A:MODE.COM ↵ COPY A:EDLIN.COM ↵
10	Go to M .	

*If you need to recover your original AUTOEXEC.BAT file later, type: COPY AUTOEXEC.SAV AUTOEXEC.BAT

**MODE.COM and EDLIN.COM are on your original DOS disks. If you have a hard disk, these files may be in a subdirectory.



Prepare your computer to communicate with the printer

If you have an ASCII text editor, you may want to use it instead of Edlin to enter the correct MODE commands. You must be able to save your AUTOEXEC.BAT file as a standard ASCII text file.

If your parallel port has a name other than "LPT1" or "LPT2" - or if your serial port has a name other than "COM1" or "COM2" - substitute that name in the examples below.

Type **EDLIN AUTOEXEC.BAT** and press return. Your screen should look like one of the following:

<div style="border: 1px solid black; padding: 5px; text-align: center;"> C>EDLIN AUTOEXEC.BAT END OF INPUT FILE * </div> <p>If your screen looks like this, follow column A instructions.</p>		<div style="border: 1px solid black; padding: 5px; text-align: center;"> C>EDLIN AUTOEXEC.BAT NEW FILE * </div> <p>If your screen look like this, follow column B instructions.</p>	
Column A		Column B	
A-1	Type L and press [Enter] to list the contents of the file. Any time the * prompt is displayed, you can type L to list the contents of your file.	B-1	Type 1i and press [Enter]. This will allow you to insert a new line 1. 1:* will appear. This prompt allows you to enter data on the indicated line.
A-2	If there are no existing MODE or PATH commands (lines beginning with the word MODE or PATH) in your file, go to step B-1 in Column B.	B-2	Type either the parallel or serial MODE command(s) (whichever is correct for your application), pressing [Enter] at the end of each line For Parallel configuration, type the MODE command: MODE LPT1:,,P and press [Enter] For Serial configuration, type the MODE commands: MODE COM1:9600,N,8,1,P and press [Enter] MODE LPT1:=COM1 and press [Enter]
A-3	If the existing MODE command(s) are correct, no change is required. Type E to exit and press [Enter]. Go to section "N". For Parallel configuration, the MODE command should be: MODE LPT1:,,P For Serial configuration, the MODE commands should be: MODE COM1:9600,N,8,1,P MODE LPT1:=COM1	B-3	After the MODE commands have been entered, hold the CTRL key down and type C to add the line(s) to the file.
A-4	If there are existing MODE commands which improperly configure the communications port, they must be deleted. To delete one line, type the number of the line to be deleted, followed by D to delete the line, then type L to list the contents of the file and press [Enter] to initiate the command (e.g., type 5DL and press [Enter] to delete line 5 and list the contents of the file.)	B-4	Type L and press [Enter] to list the contents of the file. Inspect the new lines carefully to ensure that no typographical errors have been made.
		B-5	If you have made an error, type the line number of the line and press [Enter]. Then re-type the line correctly and press [Enter]. Repeat steps B-4 and B-5 until all items are correct.
A-5	Once the incorrect mode commands have been removed, if the AUTOEXEC.BAT file contains no PATH command (a line beginning with PATH), proceed to step B-1. If your AUTOEXEC.BAT file contains a PATH command, the mode commands should be inserted after the PATH line. Type the number following the PATH line, type i and press [Enter] (e.g., if the PATH command is on line 1, type 2i and press [Enter]). Proceed with step B-2.	B-6	Once all of the edits have been made, type E and press [Enter] to exit and save.
		B-7	Reboot your computer by holding down the CTRL, ALT and DEL keys. This initiates your new AUTOEXEC.BAT file.



If you need to leave the EDLIN utility before editing or without saving your edits:

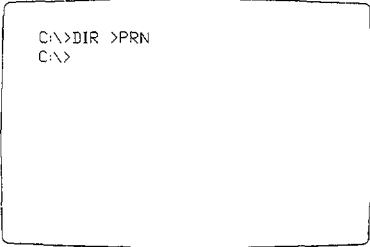
If you are at **#:*** (e.g., **1:***), hold down the CTRL key and type C.

If you are at an *****, then type Q and press [Enter].

Verify communication between MS-DOS and your printer



1. Make sure your computer and printer are on, and your printer is on-line.
2. At your MS-DOS prompt, type DIR > PRN and press .
3. The computer sends a list of the files to your LaserJet III printer. When the **Form Feed** indicator lights, the printer has received data. Press the **On Line** key to take the printer off-line and press the **Form Feed** key to eject the page.
4. Press the **On Line** key to put the printer back on-line and prepare it to receive more data.
5. If you are having trouble, go to .

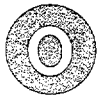


```
C:\>DIR >PRN
C:\>
```

Congratulations!

You're Done!

**Now you can set up your software to work
with your new LaserJet III printer.**

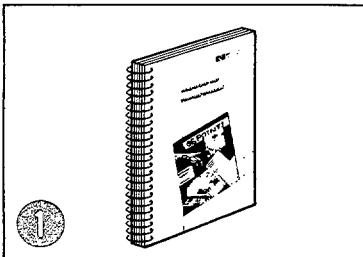


Having trouble?

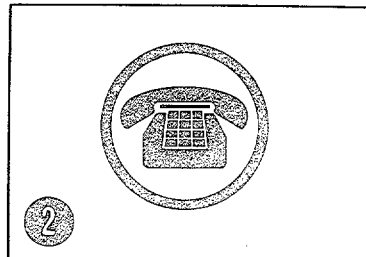
- Was your computer or printer on when you connected your interface cable?
 - Turn off your computer and printer, wait 15 seconds, and turn them on again. Continue with **N**.
- Is the interface port configured correctly?
 - Your cable may not be connected to LPT1 for a parallel interface or COM1 for a serial interface. Try working through **L**, **M**, and **N** again, substituting LPT2 if you have a parallel interface, or COM2 if you have a serial interface.
- Are all of the cables and power cords attached properly?
 - Check all of the connections.
- Is the **On Line** indicator on the printer control panel lit?
 - If not, press the **On Line** key.
- Is the printer working properly? Run the self-test described in **H**.
 - If necessary, call your HP Dealer or HP Sales Representative.
- Is your computer working properly?
 - Run an application that works.
 - If necessary, call your computer dealer or manufacturer.
- Have you set up the control panel properly?
 - Hold down the **Menu** key for about 5 seconds until the **AUTO CONT=OFF*** appears in the display window. Then step through the configuration settings.
 - If necessary, repeat **J** for a parallel interface or **K** for a serial interface, and continue through the rest of this Guide.
- Have you set up your AUTOEXEC.BAT file properly?
 - Type **TYPE AUTOEXEC.BAT** on your computer and press **↵**. Check the listing for errors in the line or lines you added.
 - If necessary, repeat **L**, **M**, and **N**.
- Do you have the correct printer cable?
 - Check **I** for a parallel interface or serial interface cables.
 - If necessary, obtain the correct cable.

If you still need help...

Consult your LaserJet III User's Manual.



Call the HP Dealer from whom you purchased your LaserJet III.



Enter your Dealer's number here:

Call Hewlett-Packard's Personal Peripherals Assist Line for help.



7:00 a.m. to 6:00 p.m. Mountain time
(7:00 a.m. to 4:00 p.m. Wednesday)

HP 33449 MEMORY BOARD INSTALLATION

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GENERAL

For installation of expansion RAM memory for the HP 33440 (1 Mbyte, P/N 33443; 2 Mbyte, P/N 33444; 4 Mbyte, P/N 33445), see the instructions packaged with the boards. The information below appears as Appendix E in the *LaserJet III User's Manual*.

Installation of the HP 33474B one-megabyte or HP 33475B two-megabyte RAM memory board allows the HP 33449 printer's standard memory to be expanded up to an additional four megabytes. Any combination of one- or two-megabyte boards—up to a maximum of four megabytes of expanded memory—can be installed in either of the printer's two memory expansion slots. Additional printer memory allows page protection to be implemented, more data to be stored in the page buffer, more soft fonts to be downloaded, and more macros to be defined.

Note



For the HP 33449 printer, use only revision "B" or later memory boards (that is, HP 33474B and HP33475B).

If the board is to be installed in a device other than the HP 33449 printer, consult the manual for that device.

PROTECT THE BOARD AND YOURSELF

Since the memory board contains electrical components easily damaged by small amounts of static electricity, the following cautions should be observed:

- If possible, use an antistatic wrist strap and a grounding mat such as those included in the *Electrically Conductive Field Service Grounding Kit* (HP 9300-0933).

OR

Before removing the board from its antistatic bag, touch the surface of the bag and any bare sheet metal surface on the printer. Maintain contact with bare metal surfaces on the printer frame while handling the board.

- To prevent static electricity buildup, avoid activities such as moving about the work area, especially if it is carpeted.
- Handle the board carefully at all times. Avoid touching board components. Never flex or put excessive pressure on it.

Warning



Hazardous voltages are present in the printer. Never remove any access cover or work near exposed electrical parts while power is connected.

IDENTIFY THE BOARD

Before installation, identify the board.

1. For part numbers, refer to Figure C-1 and the table below (XXXXX indicates that the last five digits are manufacturing numbers that may change).

Part Number	Size
33474-XXXXX	1 Megabyte
33475-XXXXX	2 Megabyte

2. If you have not received the correct board, notify Hewlett-Packard or your authorized dealer immediately.
3. If the board will not be installed immediately, place it in a cool, dry place in its original packaging.

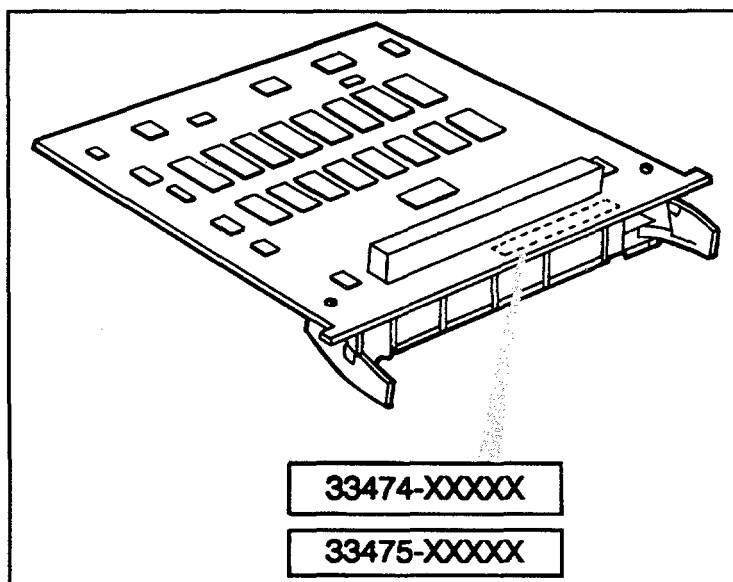


Figure C-1. Memory Board Identification

INSTALL THE BOARD

The following section describes procedures for the removal of two cover plates, insertion of the board(s), and the replacement of the cover plates. **Unless otherwise noted, replacement is the reverse of removal.** A screwdriver (flat-blade or Phillips) is needed.

Note



First, read all instructions carefully. Make sure all procedures are understood before beginning installation.

1. Switch printer OFF and unplug power cord.
2. In order to remove the plastic RAM Expansion access cover on the printer's left side base, position the printer so that its left side overhangs a supporting surface by approximately one inch (see Figure C-2).

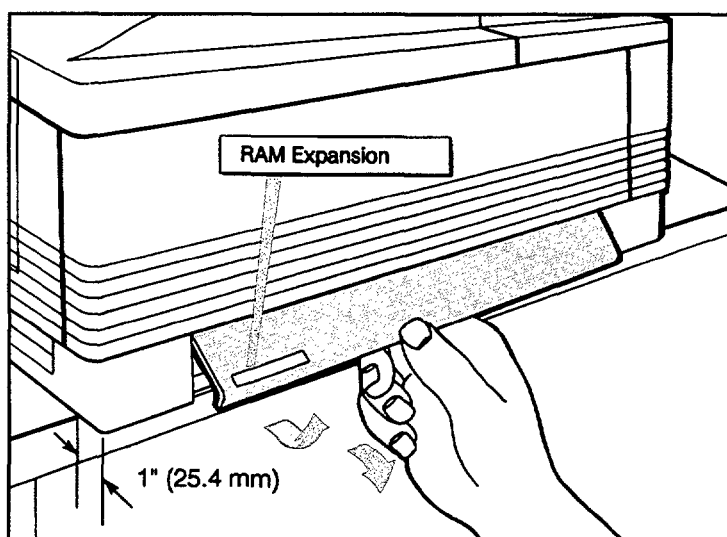


Figure C-2. Removing RAM Expansion Access Cover

Warning



The printer weighs over 50 pounds. If necessary, ask for assistance in moving it about the work area.

3. Remove the plastic RAM Expansion access cover by inserting the tip of your finger in the slot under the center of the lower edge, then pulling the plate outward and downward (see Figure C-2).

4. Loosen the three captive screws (they cannot be removed) securing the metal cover plate (see Figure C-3). Grasp the metal tab and slide the plate to the left (rear), then remove it by pulling on the tab. To discharge static electricity which could damage the board or sensitive internal printer components, maintain contact with bare sheet metal printer surfaces during installation.

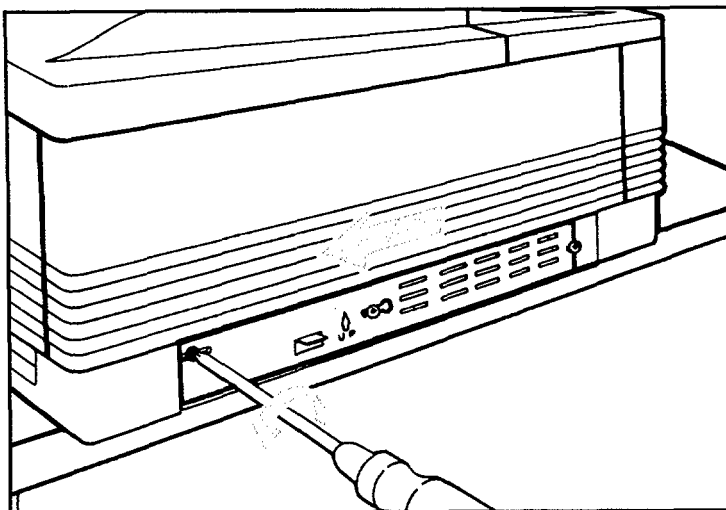


Figure C-3. Metal Cover Plate Removal

5. To install the first board, remove it from its antistatic packaging (be sure to follow antistatic procedures previously mentioned) and hold it with the surface to which the components are attached *up*. Slide the board into the printer using the slot guide rails (see Figure C-4). Be sure the board is within the guide rails.

Note



Although a single board may be installed in either the forward or rear slot, the forward slot is suggested for the first board.

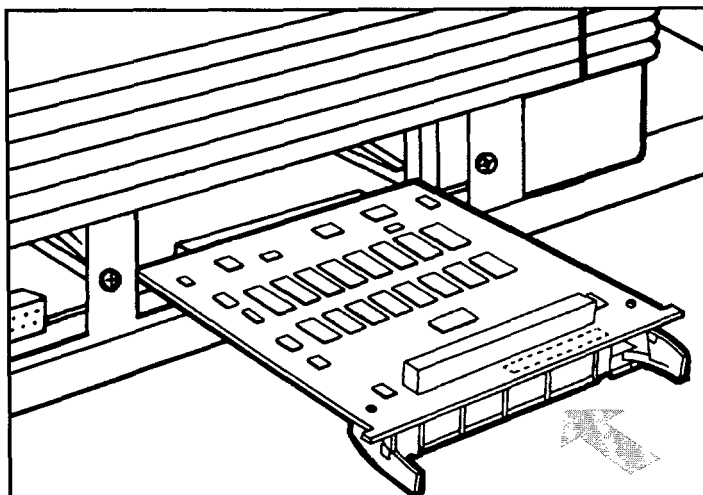


Figure C-4. Installing a Board

6. To fully seat the board, hold the printer with your free hand, then **firmly** push against the board's flat green plastic area (see Figure C-5).
7. If a second board is to be installed, insert it into the empty slot in the same manner. Be sure to **firmly** push against the green plastic area to properly seat the board's pin connector as described in step 6.

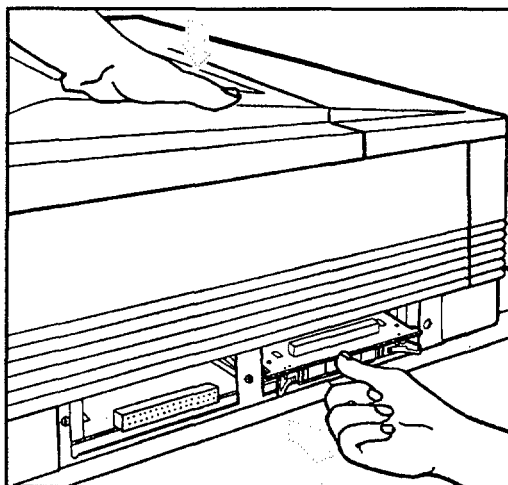


Figure C-5. Seating Board

8. To replace the metal cover plate, first place the left slot behind the left screw, then align the center slot over the center screw and push in until the plate is flush with the base. Next, slide the plate to the right as far as possible (until the right-most screw is engaged), and tighten the three screws. Replace the plastic cover.

TEST INSTALLED BOARD

- With the power switch OFF, plug in the power cord, then switch the printer ON. (Depending upon the amount of installed memory, the printer may take up to 55 seconds to reach on-line status.)
- Run a 05 SELF TEST by taking the printer off line, then holding down the **PRINT FONTS/TEST** key until 05 SELF TEST is displayed (about three seconds). When the printing portion of the test begins, 06 PRINTING TEST will be displayed. If the board is operating correctly, the self-test printout will show one of the RAM size messages in the Self-Test Message Table below.

SELF-TEST MESSAGE TABLE

Forward slot	Rear slot	RAM Size Message
1 M	None	RAM size: 2048K bytes
2 M	None	RAM size: 3072K bytes
1 M	1 M	RAM size: 3072K bytes
2 M	1 M	RAM size: 4096K bytes
1 M	2 M	RAM size: 4096K bytes
2 M	2 M	RAM size: 5120K bytes

IN CASE OF DIFFICULTY

If RAM size is incorrectly reported, repeat steps 1 through 8, checking to be sure the memory board pin connectors are **firmly** seated. The following error messages may appear:

- **53-1 ERRORUNIT or 53-2 ERRORUNIT:** Indicates an error on a RAM expansion board. The number following the dash indicates which expansion board failed (1 indicates the board in the right (front) slot, 2 the left (rear) slot). If this error appears, notify Hewlett-Packard or your authorized dealer for assistance. (The user may resume printing by clicking the **CONTINUE** key.)
- **57-1 ERRORUNIT or 57-2 ERRORUNIT:** Indicates that more than four megabytes of expanded memory have been installed. The extra memory, in one megabyte increments, in the indicated slot (1 or 2) will be ignored, but up to four megabytes total will be used. To resume printing, click the **CONTINUE** key.
- **63 SERVICE ERROR:** If this message appears, a board may be defective or incorrectly installed. First, attempt to clear the error by switching the printer off and then on again. If this does not clear the error, switch the printer OFF and check to be sure the board is seated properly. If this error still appears, notify Hewlett-Packard or your authorized dealer for assistance.

MEMORY BOARD REMOVAL

To remove a board, first access it by repeating steps 2 through 4 in the "Install the Board" section. Then unseat it (see Figure C-6) by squeezing the green tabs together while pulling toward you. Place the board in antistatic packaging.

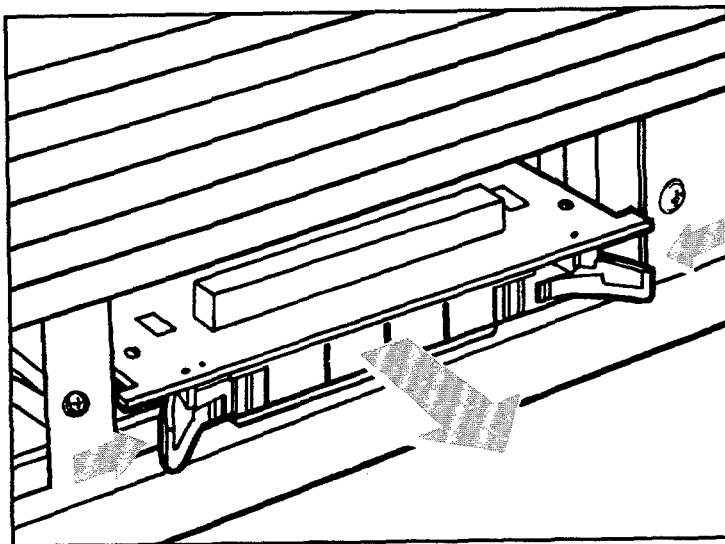


Figure C-6. Removing Board

CABLING DIAGRAMS

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OVERVIEW

The HP 33440 and HP 33449 printers support an RS-232-C serial interface, an RS-422A differential serial interface, and a Centronics parallel interface. The back of the printer has two connectors, parallel and serial, allowing you to connect one of the three interfaces.

Use the Control Panel Configuration Menu to configure the interface. The printer stores configuration information in non-volatile RAM, which means the printer saves the configuration even if you turn off the printer. For more detailed information, see the *LaserJet series II Printer Technical Reference Manual* or the *LaserJet III Printer Technical Reference Manual*.

PARALLEL INTERFACE

To configure your printer for parallel I/O operation, use the Configuration Menu and the instructions in the pamphlets, *Your Road Map to setting up Your LaserJet series II Printer* (see Appendix A) or *Your Guide to Setting Up Your LaserJet III Printer* (see Appendix B). When you configure your printer for parallel operation, you can send data to the printer using the Centronics parallel communication protocol. Table D-1 lists the signals and pin designations used for parallel communication.

Table D-1. Parallel Interface Connector Pin Assignments.

Signal	Pin	Pin	Signal
-Strobe (Input)	1	19	Strobe Return (GND)
Data 1 (Input)	2	20	Data 1 (GND)
Data 2 (Input)	3	21	Data 2 (GND)
Data 3 (Input)	4	22	Data 3 (GND)
Data 4 (Input)	5	23	Data 4 (GND)
Data 5 (Input)	6	24	Data 5 (GND)
Data 6 (Input)	7	25	Data 6 (GND)
Data 7 (Input)	8	26	Data 7 (GND)
Data 8 (Input)	9	27	Data 8 (GND)
-Acknlg (Output)	10	28	Acknlg Return (GND)
Busy (Output)	11	29	Busy Return (GND)
Paper error (Output)	12	30	Signal GND
Select (Output)	13	31	-Input Prime (Input)
NC	14	32	-Nfault (Output)
NC	15	33	Auxout1 (Output)
O VDC	16	34	NC
Chassis GND	17	35	Auxout2 (Output)
+5 VDC (output)	18	36	NC

The dash (-) before some signals indicates that the signal is negative true (active LOW). GND means the connection is a ground. NC indicates that the pin has no connection.

SERIAL INTERFACE

Use the Configuration Menu and the instructions in either Appendix A or Appendix B to configure your printer for serial I/O operation. When you configure your printer for serial operation, you transfer data to the printer using serial communication protocol. You can use either RS-232-C or RS-422A cable.

Table D-2 lists RS-232-C and RS-422A pin assignments and signal descriptions. Those pins not appearing in the table are not used.

Table D-2. RS-232-C and RS-422A Pin Assignments and Signal Descriptions.

Pin Number	Description	RS-232-C	RS-422	I/O
1	Protective ground (shield).	I	I	-
2	Transmitted data (data from the printer).	*		Output
3	Received data (received by the printer).	*		Input
	Received data inverted (RDA) (received by printer)		*	Input
4	Request to send. This signal is HIGH whenever the printer is powered ON.	*		Output
5	Clear to send. This signal is not required for the printer to transmit flow control characters. (DC1/DC3).	*		Input
6	Data set ready. This signal is not required for the printer to receive data.	*		Input
7	Signal ground.	*	*	
9	Send data inverted (SDA).		*	Output
10	Send data noninverted (SDB).		*	Output
18	Receive data noninverted (RDB).		*	Input
20	Data terminal ready. (Polarity can be set from the printer Control Panel. Normally set to HI. Refer to host interface specifications for polarity requirements.)	*		Output

*The asterisks identify signals that are used.

CABLING SCHEMATICS

The following serial cabling schematics are typical of IBM (AT/XT) and compatible personal computers using the standard (9/25) pin serial RS-232-C interface.

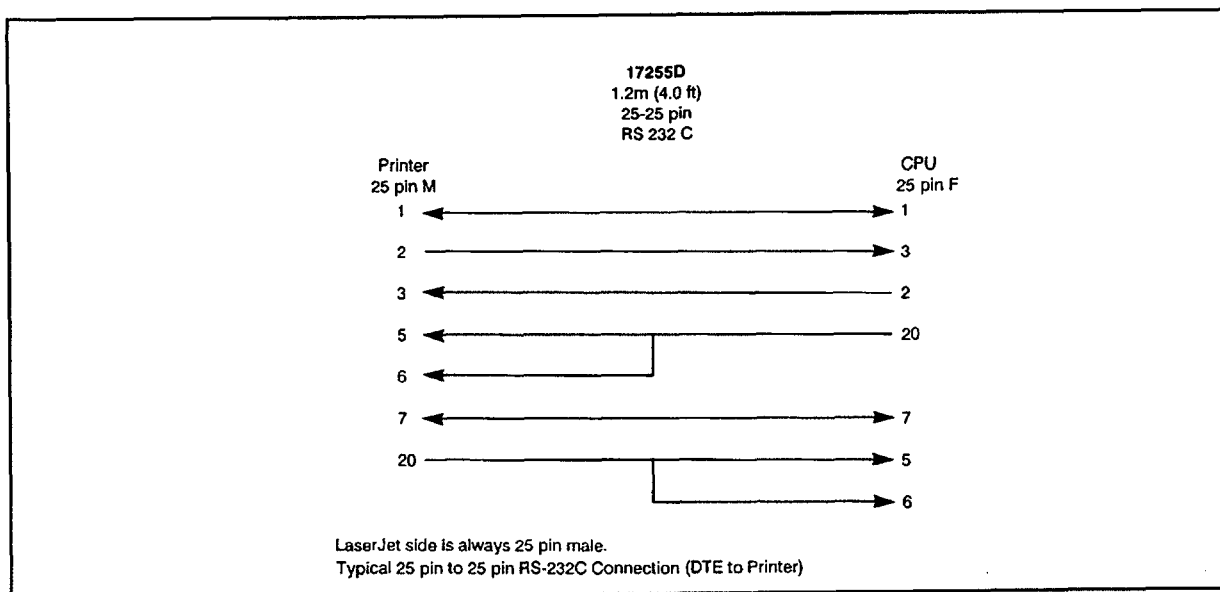


Figure D-1. Typical PC/XT (and compatible) and PS/2 pin assignments

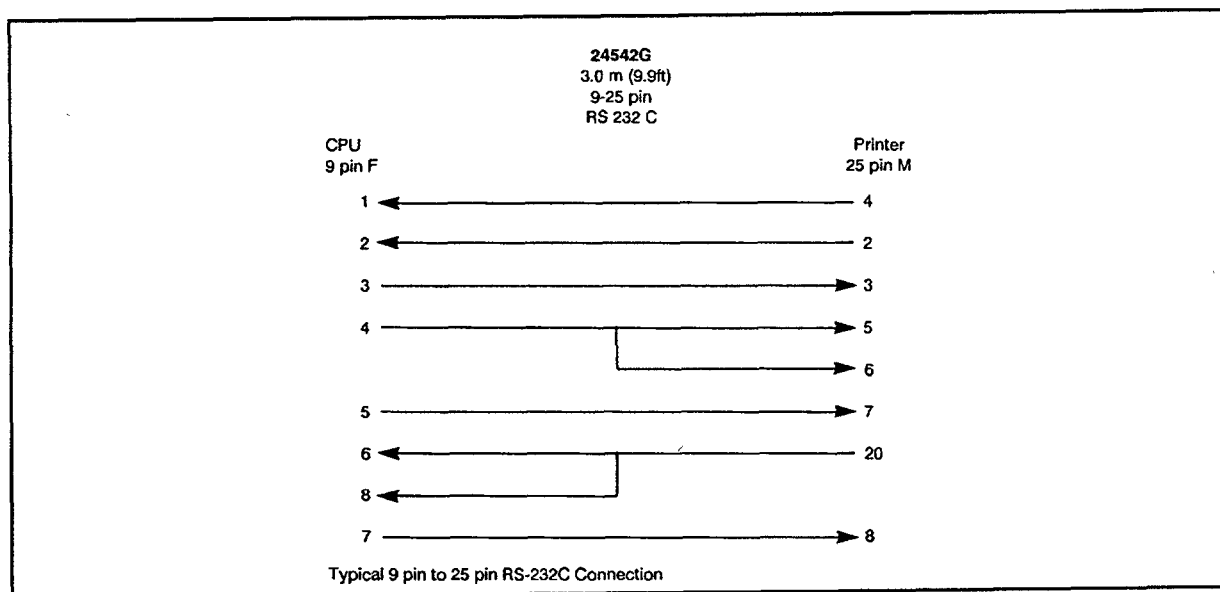


Figure D-2. Typical AT (and compatible) pin assignments

HP 33440/HP 33449 COMBINED SERVICE MANUAL

The following cabling schematic is based on an HP Vectra PC with an HP24541B RS-422A interface card installed. Your configuration may vary.

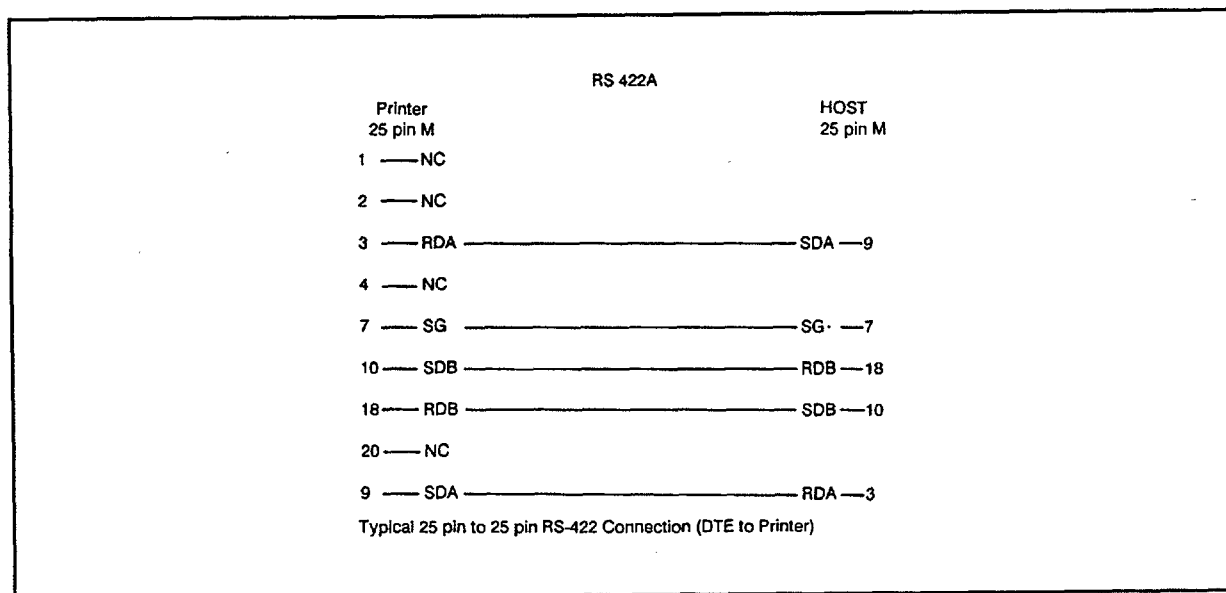


Figure D-3. Typical RS-422A 25-25 pin assignments.

HP 33440/HP 33449 PRINTER COMMANDS

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GENERAL

In the printer command summary which follows, the portions which are in color are HP 33449-specific. The portions in white apply to both printers. The HP 33440 uses the PCL4 Printer Command Language. The HP 33449 uses the PCL5 Printer Command Language.

PCL PRINTER COMMANDS

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
JOB CONTROL COMMANDS				
RESET				
RESET NUMBER OF COPIES	— # of Copies (1-99)	E _c E E _c &/#X (x)	027 069 027 038 108 #...# 088 (120)	1B 45 1B 26 6C #...# 58 (78)
LONG-EDGE (LEFT) OFFSET REGISTRATION	# of Decipoints (1/720")	E _c &/#U (u)	027 038 108 #...# 085 (117)	1B 26 6C #...# 55 (75)
SHORT-EDGE (TOP) OFFSET REGISTRATION	# of Decipoints (1/720")	E _c &/#Z (z)	027 038 108 #...# 090 (122)	1B 26 6C #...# 5A (7A)
PAGE CONTROL COMMANDS				
PAGE LENGTH and SIZE				
PAPER SOURCE	Eject Page Paper Tray Auto Feed Manual Feed Manual Envelope Feed	E _c &/0H (h) E _c &/1H (h) E _c &/2H (h) E _c &/3H (h)	027 038 108 048 072 (104) 027 038 108 049 072 (104) 027 038 108 050 072 (104) 027 038 108 051 072 (104)	1B 26 6C 30 48 (68) 1B 26 6C 31 48 (68) 1B 26 6C 32 48 (68) 1B 26 6C 33 48 (68)
PAGE SIZE (Envelopes)	Executive Letter Legal A4 Monarch COM 10 DL C5	E _c &/1A (a) E _c &/2A (a) E _c &/3A (a) E _c &/26A (a) E _c &/80A (a) E _c &/81A (a) E _c &/90A (a) E _c &/91A (a)	027 038 108 049 065 (97) 027 038 108 050 065 (97) 027 038 108 051 065 (97) 027 038 108 050 054 065 (97) 027 038 108 056 048 065 (97) 027 038 108 056 049 065 (97) 027 038 108 057 048 065 (97) 027 038 108 057 049 065 (97)	1B 26 6C 31 41 (61) 1B 26 6C 32 41 (61) 1B 26 6C 33 41 (61) 1B 26 6C 32 36 41 (61) 1B 26 6C 38 30 41 (61) 1B 26 6C 38 31 41 (61) 1B 26 6C 39 30 41 (61) 1B 26 6C 39 31 41 (61)
PAGE LENGTH	# of Lines	E _c &/#P (p)	027 038 108 #...# 080 (112)	1B 26 6C #...# 50 (70)
ORIENTATION				
ORIENTATION	Portrait Landscape Reverse Portrait Reverse Landscape	E _c &/0O (o) E _c &/1O (o) E _c &/2O (o) E _c &/3O (o)	027 038 108 048 079 (111) 027 038 108 049 079 (111) 027 038 108 050 079 (111) 027 038 108 051 079 (111)	1B 26 6C 30 4F (6F) 1B 26 6C 31 4F (6F) 1B 26 6C 32 4F (6F) 1B 26 6C 33 4F (6F)
PRINT DIRECTION	# Degrees of Rotation (counterclockwise, 90° increments only)	E _c &a#P	027 038 097 #...# 080 (112)	1B 26 61 #...# 50 (70)

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
MARGINS and TEXT LENGTH				
TOP MARGIN	# of Lines	Ec&f#E (e)	027 038 108 #...# 069 (101)	1B 26 6C #...# 45 (65)
TEXT LENGTH	# of Lines	Ec&f#F (f)	027 038 108 #...# 070 (102)	1B 26 6C #...# 46 (66)
LEFT MARGIN	# of Columns	Ec&a#L (l)	027 038 097 #...# 076 (108)	1B 26 61 #...# 4C (6C)
RIGHT MARGIN	# of Columns	Ec&a#M (m)	027 038 097 #...# 077 (109)	1B 26 61 #...# 4D (6D)
CLEAR HORIZONTAL MARGINS	—	Ec9	027 057	1B 39
PERFORATION SKIP MODE				
PERFORATION SKIP	Disable	Ec&f0L (l)	027 038 108 048 076 (108)	1B 26 6C 30 4C (6C)
	Enable	Ec&f1L (l)	027 038 108 049 076 (108)	1B 26 6C 31 4C (6C)
HORIZONTAL COLUMN SPACING				
HORIZONTAL MOTION INDEX (HMI)	# of 1/120" Increments	Ec&k#H (h)	027 038 107 #...# 0 48 072 (104)	1B 26 6B #...# 4B (6B)
VERTICAL LINE SPACING				
VERTICAL MOTION INDEX (VMI)	# of 1/48" Increments	Ec&f#C (c)	027 038 108 #...# 048 076 (99)	1B 26 6C #...# 43 (63)
LINE SPACING (Lines per Inch)	1 line/inch	Ec&f1D (d)	027 038 108 049 068 (100)	1B 26 6C 31 44 (64)
	2 lines/inch	Ec&f2D (d)	027 038 108 050 068 (100)	1B 26 6C 32 44 (64)
	3 lines/inch	Ec&f3D (d)	027 038 108 051 068 (100)	1B 26 6C 33 44 (64)
	4 lines/inch	Ec&f4D (d)	027 038 108 052 068 (100)	1B 26 6C 34 44 (64)
	6 lines/inch	Ec&f6D (d)	027 038 108 054 068 (100)	1B 26 6C 36 44 (64)
	8 lines/inch	Ec&f8D (d)	027 038 108 056 068 (100)	1B 26 6C 38 44 (64)
	12 lines/inch	Ec&f12D (d)	027 038 108 049 050 068 (100)	1B 26 6C 31 32 44 (64)
	16 lines/inch	Ec&f16D (d)	027 038 108 049 054 068 (100)	1B 26 6C 31 36 44 (64)
	24 lines/inch	Ec&f24D (d)	027 038 108 050 052 068 (100)	1B 26 6C 32 34 44 (64)
	48 lines/inch	Ec&f48D (d)	027 038 108 052 056 068 (100)	1B 26 6C 34 38 44 (64)
CURSOR POSITIONING				
VERTICAL and HORIZONTAL				
VERTICAL POSITION	# of Rows	Ec&a#R (r)	027 038 097 #...# 082 (114)	1B 26 61 #...# 52 (72)
	# of Dots	Ec*p#Y (y)	027 042 112 #...# 089 (121)	1B 2A 70 #...# 59 (79)
	# of Decipoints	Ec&a#V (v)	027 038 097 #...# 086 (118)	1B 26 61 #...# 56 (76)
HORIZONTAL POSITION	# of Columns	Ec&a#C (c)	027 038 097 #...# 067 (99)	1B 26 61 #...# 43 (63)
	# of Dots	Ec*p#X (x)	027 042 112 #...# 088 (120)	1B 2A 70 #...# 58 (78)
	# of Decipoints	Ec&a#H (h)	027 038 097 #...# 072 (104)	1B 26 61 #...# 48 (68)
HALF LINE FEED		Ec =	027 061	1B 3D

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
END-OF-LINE TERMINATION				
LINE TERMINATION	CR=CR; LF=LF; FF=FF	E _c &k0G (g)	027 038 107 048 071 (103)	1B 26 6B 30 47 (67)
	CR=CR+LF; LF=LF; FF=FF	E _c &k1G (g)	027 038 107 049 071 (103)	1B 26 6B 31 47 (67)
	CR=CR; LF=CR+LF; FF=CR+FF	E _c &k2G (g)	027 038 107 050 071 (103)	1B 26 6B 32 47 (67)
	CR=CR+LF; LF=CR+LF; FF=CR+FF	E _c &k3G (g)	027 038 107 051 071 (103)	1B 26 6B 33 47 (67)
PUSH/POP POSITION				
PUSH/POP POSITION	Push	E _c &t0S (s)	027 038 102 048 083 (115)	1B 26 66 30 53 (73)
	Pop	E _c &t1S (s)	027 038 102 049 083 (115)	1B 26 66 31 53 (73)
FONT SELECTION				
SYMBOL SET SELECTION†				
PRIMARY SYMBOL SET	ISO 60: Norwegian 1	E _c (0D (d)	027 040 048 068 (100)	1B 28 30 44 (64)
	*ISO 61: Norwegian 2	E _c (1D (d)	027 040 049 068 (100)	1B 28 31 44 (64)
	ISO 4: United Kingdom	E _c (1E (e)	027 040 049 069 (101)	1B 28 31 45 (65)
	*ISO 25: French (obsolete)	E _c (0F (f)	027 040 048 070 (102)	1B 28 30 46 (66)
	ISO 69: French	E _c (1F (f)	027 040 049 070 (102)	1B 28 31 46 (66)
	*HP German (obsolete)	E _c (0G (g)	027 040 048 071 (103)	1B 28 30 47 (67)
	ISO 21: German	E _c (1G (g)	027 040 049 071 (103)	1B 28 31 47 (67)
	ISO 15: Italian	E _c (0I (i)	027 040 048 073 (105)	1B 28 30 49 (69)
	*ISO 14: JIS ASCII	E _c (0K (k)	027 040 048 075 (107)	1B 28 30 4B (6B)
	*ISO 57: Chinese	E _c (2K (k)	027 040 050 075 (107)	1B 28 32 4B (6B)
	ECMA-94 Latin 1	E _c (0N (n)	027 040 048 78 (110)	1B 28 30 4E (6E)
	ISO 11: Swedish	E _c (0S (s)	027 040 048 083 (115)	1B 28 30 53 (73)
	*HP Spanish (obsolete)	E _c (1S (s)	027 040 049 083 (115)	1B 28 31 53 (73)
	ISO 17: Spanish	E _c (2S (s)	027 040 050 083 (115)	1B 28 32 53 (73)
	*ISO 10: Swedish	E _c (3S (s)	027 040 051 083 (115)	1B 28 33 53 (73)
	*ISO 16: Portuguese	E _c (4S (s)	027 040 052 083 (115)	1B 28 34 53 (73)
	*ISO 84: Portuguese	E _c (5S (s)	027 040 053 083 (115)	1B 28 35 53 (73)
	*ISO 85: Spanish	E _c (6S (s)	027 040 054 083 (115)	1B 28 36 53 (73)
	ISO 6: ASCII	E _c (0U (u)	027 040 048 085 (117)	1B 28 30 55 (75)
	*ISO 2: IRV	E _c (2U (u)	027 040 050 085 (117)	1B 28 32 55 (75)
	Roman8	E _c (8U (u)	027 040 056 85 (117)	1B 28 38 55 (75)
	PC-8	E _c (10U (u)	027 040 049 048 085 (117)	1B 28 31 30 55 (75)
	PC-8 D/N	E _c (11U (u)	027 040 049 049 085 (117)	1B 28 31 31 55 (75)
	PC 850	E _c (12U (u)	027 040 049 050 085 (117)	1B 28 31 32 55 (75)

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

† Additional symbol sets are supported. Refer to the LaserJet series II and the LaserJet III technical manuals.

*These symbol sets are becoming low usage sets and are not recommended for future use.

The Primary font printer commands in this table can be specified as secondary by replacing the left parenthesis "(" in the command with a right parenthesis ")."

HP 33440/HP 33449 COMBINED SERVICE MANUAL

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
SPACING				
PRIMARY SPACING	Proportional	Ec(s1P (p)	027 040 115 049 080 (112)	1B 28 73 31 50 (70)
	Fixed	Ec(s0P (p)	027 040 115 048 080 (112)	1B 28 73 30 50 (70)
PITCH				
PRIMARY PITCH	# Characters/inch	Ec(s#H (h)	027 040 115 #...# 072 (104)	1B 28 73 #...# 48 (68)
SET PITCH MODE	10.0	Ec&k0S (s)	027 038 107 048 083 (115)	1B 26 6B 30 53 (73)
	Compressed (16.5-16.7)	Ec&k2S (s)	027 038 107 050 083 (115)	1B 26 6B 32 53 (73)
	Elite (12.0)	Ec&k4S (s)	027 038 107 052 083 (115)	1B 26 6B 34 53 (73)
POINT SIZE				
PRIMARY HEIGHT	# Points	Ec(s#V (v)	027 040 115 #...# 086 (118)	1B 28 73 #...# 56 (76)
STYLE				
PRIMARY STYLE	Upright	Ec(s0S (s)	027 040 115 048 083 (115)	1B 28 73 30 53 (73)
	Italic	Ec(s1S (s)	027 040 115 049 083 (115)	1B 28 73 31 53 (73)
The LaserJet III printer allows you to specify complex structures (contours, outlines, shading, etc.) and widths as well as posture. Refer to the LaserJet III Technical Reference Manual.				
STROKE WEIGHT				
PRIMARY FONT STROKE WEIGHT	Ultra Thin	Ec(s-7B	027 040 115 -055 066 (98)	1B 28 73 -37 42 (62)
	Extra Thin	Ec(s-6B	027 040 115 -054 066 (98)	1B 28 73 -36 42 (62)
	Thin	Ec(s-5B	027 040 115 -053 066 (98)	1B 28 73 -35 42 (62)
	Extra Light	Ec(s-4B	027 040 115 -052 066 (98)	1B 28 73 -34 42 (62)
	Light	Ec(s-3B	027 040 115 -051 066 (98)	1B 28 73 -33 42 (62)
	Demi Light	Ec(s-2B	027 040 115 -050 066 (98)	1B 28 73 -32 42 (62)
	Semi Light	Ec(s-1B	027 040 115 -049 066 (98)	1B 28 73 -31 42 (62)
	Medium (normal)	Ec(s0B	027 040 115 048 066 (98)	1B 28 73 30 42 (62)
	Semi Bold	Ec(s1B	027 040 115 049 066 (98)	1B 28 73 31 42 (62)
	Demi Bold	Ec(s2B	027 040 115 050 066 (98)	1B 28 73 32 42 (62)
	Bold	Ec(s3B	027 040 115 051 066 (98)	1B 28 73 33 42 (62)
	Extra Bold	Ec(s4B	027 040 115 052 066 (98)	1B 28 73 34 42 (62)
	Black	Ec(s5B	027 040 115 053 066 (98)	1B 28 73 35 42 (62)
	Extra Black	Ec(s6B	027 040 115 054 066 (98)	1B 28 73 36 42 (62)
	Ultra Black	Ec(s7B	027 040 115 055 066 (98)	1B 28 73 37 42 (62)
PRIMARY TYPEFACE				
TYPEFACE	Courier	Ec(s3T (t)	027 040 115 051 084 (116)	1B 28 73 33 54 (74)
	Univers	Ec(s4148T (t)	027 040 115 052 084 (116)	1B 28 73 34 54 (74)
	LinePrinter	Ec(s0T (t)	027 040 115 048 084 (116)	1B 28 73 30 54 (74)
	CG Times	Ec(s4101T (t)	027 040 115 053 084 (116)	1B 28 73 35 54 (74)
Many more typefaces are supported. Refer to the LaserJet series II and the LaserJet III technical reference manuals.				

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

The primary font printer commands in this table can be specified as secondary by replacing the left parenthesis "(" in the command with a right parenthesis ")".

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
FONT DEFAULT				
FONT DEFAULT	Primary Font	Ec(3@	027 040 051 064	1B 28 33 40
	Secondary Font	Ec)3@	027 041 051 064	1B 29 33 40
UNDERLINE				
UNDERLINE	Enable Fixed	Ec&d0D (d)	027 038 100 048 068 (100)	1B 26 64 30 44 (64)
	Enable Floating	Ec&d3D (d)	027 038 100 051 068 (100)	1B 26 64 33 44 (64)
	Disable	Ec&d@	027 038 100 064	1B 26 64 40
TRANSPARENT PRINT				
TRANSPARENT PRINT DATA	# of Bytes	Ec&p#X[Data]	027 038 112 #...# 088	1B 26 70 #...# 58
FONT MANAGEMENT				
ASSIGN FONT ID	Font ID #	Ec*c#D (d)	027 042 099 #...# 068 (100)	1B 2A 63 #...# 44 (64)
FONT AND CHARACTER CONTROL	Delete all Fonts	Ec*c0F (f)	027 042 099 048 070 (102)	1B 2A 63 30 46 (66)
	Delete all Temporary Fonts	Ec*c1F (f)	027 042 099 049 070 (102)	1B 2A 63 31 46 (66)
	Delete Last Font ID Specified	Ec*c2F (f)	027 042 099 050 070 (102)	1B 2A 63 32 46 (66)
	Delete Last Character Specified	Ec*c3F (f)	027 042 099 051 070 (102)	1B 2A 63 33 46 (66)
	Make Font Temporary	Ec*c4F (f)	027 042 099 052 070 (102)	1B 2A 63 34 46 (66)
	Make Font Permanent	Ec*c5F (f)	027 042 099 053 070 (102)	1B 2A 63 35 46 (66)
	Copy/Assign the Currently Invoked Font as Temporary	Ec*c6F (f)	027 042 099 054 070 (102)	1B 2A 63 36 46 (66)
FONT SELECTION BY ID NUMBER				
SELECT FONT (with ID #)	ID # Primary Font	Ec(#X (x)	027 040 #...# 088 (120)	1B 28 #...# 58 (78)
	ID # Secondary Font	Ec)#X (x)	027 041 #...# 088 (120)	1B 29 #...# 58 (78)
SOFT FONT CREATION				
FONT DESCRIPTOR (FONT HEADER)	# of Bytes	Ec)s#W[Data]	027 041 115 #...# 087	1B 29 73 #...# 57
DOWNLOAD CHARACTER	# of Bytes	Ec(s#W[Data]	027 040 115 #...# 087	1B 28 73 #...# 57
CHARACTER CODE	Character Code # (decimal)	Ec*c#E (e)	027 042 099 #...# 069 (101)	1B 2A 63 #...# 45 (65)

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
GRAPHICS				
VECTOR GRAPHICS				
ENTER HP-GL/2 MODE	Use Previous HP-GL/2 Pen Position	E _c %0B	027 037 048 066 (98)	1B 25 30 42 (62)
	Use Current PCL CAP	E _c %1B	027 037 049 066 (98)	1B 25 31 42 (62)
HP-GL/2 PLOT HORIZONTAL SIZE	Horizontal Size in Inches	E _c *c#K	027 042 099 #...# 075 (107)	1B 2A 63 #...# 4B (6B)
HP-GL/2 PLOT VERTICAL SIZE	Vertical Size in Inches	E _c *c#L	027 042 099 #...# 076 (108)	1B 2A 63 #...# 4C (6C)
SET PICTURE FRAME ANCHOR POINT	Set Anchor Point to CAP	E _c *c0T	027 042 099 048 084 (116)	1B 2A 63 30 54 (74)
PICTURE FRAME HORIZONTAL SIZE	Decipoints	E _c *c#X	027 042 99 #...# 088 (120)	1B 2A 63 #...# 58 (78)
PICTURE FRAME VERTICAL SIZE	Decipoints	E _c *c#Y	027 042 99 #...# 089 (121)	1B 2A 63 #...# 59 (79)
RASTER GRAPHICS				
RASTER RESOLUTION	75 Dots/inch	E _c *t75R (r)	027 042 116 055 053 082 (114)	1B 2A 74 37 35 52 (72)
	100 Dots/inch	E _c *t100R (r)	027 042 116 049 048 048 082 (114)	1B 2A 74 31 30 30 52 (72)
	150 Dots/inch	E _c *t150R (r)	027 042 116 049 053 048 082 (114)	1B 2A 74 31 35 30 52 (72)
	300 Dots/inch	E _c *t300R (r)	027 042 116 051 048 048 082 (114)	1B 2A 74 33 30 30 52 (72)

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FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
RASTER GRAPHICS PRESENTATION				
RASTER GRAPHICS PRESENTATION	Rotate Image	Ec*r0F (f)	027 042 114 048 070 (102)	1B 2A 72 30 46 (66)
	LaserJet Landscape Compatible	Ec*r3F (f)	027 042 114 051 070 (102)	1B 2A 72 33 46 (66)
START RASTER GRAPHICS	Left Raster Graphics Margin	Ec*r0A (a)	027 042 114 048 065 (97)	1B 2A 72 30 41 (61)
	Current Cursor	Ec*r1A (a)	027 042 114 049 065 (97)	1B 2A 72 31 41 (61)
RASTER Y OFFSET	# of Raster Lines of Vertical Movement	Ec*b#Y (y)	027 042 098 #...# 089 (120)	1B 2A 62 #...# 59 (79)
SET RASTER COMPRESSION MODE	Uncoded	Ec*b0M (m)	027 042 098 048 077 (109)	1B 2A 62 30 41 (6D)
	Run-Length Encoded	Ec*b1M (m)	027 042 098 049 077 (109)	1B 2A 62 31 41 (6D)
	Tagged Image File Format	Ec*b2M (m)	027 042 098 050 077 (109)	1B 2A 62 32 41 (6D)
	Delta Row	Ec*b3M (m)	027 042 098 051 077 (109)	1B 2A 72 33 41 (6D)
TRANSFER RASTER DATA	# of Bytes	Ec*b#W[Data]	027 042 098 #...# 087	1B 2A 62 #...# 57
END RASTER GRAPHICS	—	Ec*rB (b)	027 042 114 066 (98)	1B 2A 72 42 (62)
RASTER HEIGHT	# Raster Rows	Ec*r#T (t)	027 042 114 #...# 084 (116)	1B 2A 72 #...# 54 (74)
RASTER WIDTH	# Pixels of the Specified Resolution	Ec*r#S (s)	027 042 114 #...# 083 (115)	1B 2A 72 #...# 53 (73)

THE PRINT MODEL

IMAGING				
SELECT PATTERN	Solid Black (default)	Ec*v0T	027 042 118 048 084 (116)	1B 2A 76 30 54 (74)
	Solid White	Ec*v1T	027 042 118 049 084 (116)	1B 2A 76 31 54 (74)
	HP-defined Shading Pattern	Ec*v2T	027 042 118 050 084 (116)	1B 2A 76 32 54 (74)
	HP-defined Cross-Hatched Pattern	Ec*v3T	027 042 118 051 084 (116)	1B 2A 76 33 54 (74)
SELECT SOURCE TRANSPARENCY MODE	Transparent	Ec*v0N	027 042 118 048 078 (110)	1B 2A 76 31 42 (6E)
	Opaque	Ec*v1N	027 042 118 049 078 (110)	1B 2A 76 31 42 (6E)
SELECT PATTERN TRANSPARENCY MODE	Transparent	Ec*v0O	027 042 118 048 079 (111)	1B 2A 76 30 43 (6F)
	Opaque	Ec*v1O	027 042 118 049 079 (111)	1B 2A 76 31 43 (6F)

RECTANGLE DIMENSIONS

RECTANGLE WIDTH (Horizontal Size)	# of Dots	Ec*c#A (a)	027 042 099 #...# 065 (97)	1B 2A 63 #...# 41 (61)
	# of Decipoints	Ec*c#H (h)	027 042 099 #...# 072 (104)	1B 2A 63 #...# 48 (68)
RECTANGLE HEIGHT (Vertical Size)	# of Dots	Ec*c#B (b)	027 042 099 #...# 066 (98)	1B 2A 63 #...# 42 (62)
	# of Decipoints	Ec*c#V (v)	027 042 099 #...# 086 (118)	1B 2A 63 #...# 56 (76)

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FUNCTION	PARAMETER	COMMAND	DECIMAL VALUE	HEXADECIMAL VALUE
RECTANGULAR AREA FILL				
FILL RECTANGULAR AREA	Solid Black	Ec*c0P	027 042 099 048 080 (112)	1B 2A 63 30 50 (70)
	Erase (Solid White Area Fill)	Ec*1P	027 042 099 049 080 (112)	1B 2A 63 31 50 (70)
	Shaded Fill	Ec*c2P	027 042 099 050 080 (112)	1B 2A 63 32 50 (70)
	Cross-hatched Fill	Ec*c3P	027 042 099 051 080 (112)	1B 2A 33 33 50 (70)
	User Defined	Ec*c4P	027 042 099 052 080 (112)	1B 2A 63 34 50 (70)
	Current Pattern	Ec*c5P	027 042 099 053 080 (112)	1B 2A 63 35 50 (70)
PATTERN ID	% of Shading or Type of Pattern	Ec*c#G	027 042 099 #...# 071 (103)	1B 2A 63 #...# 47 (67)
SHADING	2% Gray	Ec*c2G (g)	027 042 099 050 071 (103)	1B 2A 63 32 47 (67)
	10% Gray	Ec*c10G (g)	027 042 099 049 048 071 (103)	1B 2A 63 31 30 47 (67)
	15% Gray	Ec*c15G (g)	027 042 099 049 053 071 (103)	1B 2A 63 31 35 47 (67)
	30% Gray	Ec*c30G (g)	027 042 099 051 048 071 (103)	1B 2A 63 33 30 47 (67)
	45% Gray	Ec*c45G (g)	027 042 099 052 053 071 (103)	1B 2A 63 34 35 47 (67)
	70% Gray	Ec*c70G (g)	027 042 099 055 048 071 (103)	1B 2A 63 37 30 47 (67)
	90% Gray	Ec*c90G (g)	027 042 099 057 048 071 (103)	1B 2A 63 39 30 47 (67)
	100% Gray	Ec*c100G (g)	027 042 099 049 048 048 071 (103)	1B 2A 63 31 30 30 47 (67)
PATTERN	1 Horiz. Line	Ec*c1G (g)	027 042 099 049 071 (103)	1B 2A 63 31 47 (67)
	2 Vert. Lines	Ec*c2G (g)	027 042 099 050 071 (103)	1B 2A 63 32 47 (67)
	3 Diagonal Lines	Ec*c3G (g)	027 042 099 051 071 (103)	1B 2A 63 33 47 (67)
	4 Diagonal Lines	Ec*c4G (g)	027 042 099 052 071 (103)	1B 2A 63 34 47 (67)
	5 Square Grid	Ec*c5G (g)	027 042 099 053 071 (103)	1B 2A 63 35 47 (67)
	6 Diagonal Grid	Ec*c6G (g)	027 042 099 054 071 (103)	1B 2A 63 36 47 (67)
MACROS				
MACRO ID	Macro ID #	Ec&f#Y (y)	027 038 102 #...# 089 (121)	1B 26 66 #...# 59 (79)
MACRO CONTROL	Start Macro Def.	Ec&f0X (x)	027 038 102 048 088 (120)	1B 26 66 30 58 (78)
	Stop Macro Def.	Ec&f1X (x)	027 038 102 049 088 (120)	1B 26 66 31 58 (78)
	Execute Macro	Ec&f2X (x)	027 038 102 050 088 (120)	1B 26 66 32 58 (78)
	Call Macro	Ec&f3X (x)	027 038 102 051 088 (120)	1B 26 66 33 58 (78)
	Enable Overlay	Ec&f4X (x)	027 038 102 052 088 (120)	1B 26 66 34 58 (78)
	Disable Overlay	Ec&f5X (x)	027 038 102 053 088 (120)	1B 26 66 35 58 (78)
	Delete Macros	Ec&f6X (x)	027 038 102 054 088 (120)	1B 26 66 36 58 (78)
	Delete All Temp. Macros	Ec&f7X (x)	027 038 102 055 088 (120)	1B 26 66 37 58 (78)
	Delete Macro ID	Ec&f8X (x)	027 038 102 056 088 (120)	1B 26 66 38 58 (78)
	Make Temporary	Ec&f9X (x)	027 038 102 057 088 (120)	1B 26 66 39 58 (78)
	Make Permanent	Ec&f10X (x)	027 038 102 049 048 088 (120)	1B 26 66 31 30 58 (78)
PROGRAMMING SWITCHES				
DISPLAY FUNCTIONS	ON OFF	EcY EcZ	027 089 027 090	1B 59 1B 5A
END-OF-LINE WRAP	Enabled	Ec&s0C (c)	027 038 115 048 067 (99)	1B 26 73 30 43 (63)
	Disabled	Ec&s1C (c)	027 038 115 049 067 (99)	1B 26 73 31 43 (63)

Values in the parentheses identify the lower case of the termination character. This value is used if the printer command is combined.

PCL5 HP-GL/2 PRINTER COMMANDS (HP 33449 ONLY)

COMMAND	MNEMONIC	PARAMETERS*
DUAL CONTEXT EXTENSIONS		
ENTER PCL MODE	Esc%#A	0 - Retain previous PCL cursor position and palette 1 - Use current HPGL pen position and palette
RESET	EscE	None
PRIMARY FONT	FI	Font_ID
SECONDARY FONT	FN	Font_ID
SCALABLE OR BITMAPPED FONTS	SB	0 - Scalable fonts only 1 - Bitmapped fonts allowed
PALETTE EXTENSIONS		
TRANSPARENCY MODE	TR	0 - Off (opaque) 1 - On (transparent)
NUMBER OF PENS	NP	2,4,8
SCREENED VECTORS	SV	[screen_type[,shading[,index]]]

HP-GL/2 Kernel

VECTOR GROUP

*Parameters in brackets are optional.

ARC ABSOLUTE	AA	x_center,y_center,sweep_angle [,chord_angle];
ARC RELATIVE	AR	x_increment,y_increment,sweep_angle [,chord_angle];
ABSOLUTE ARC THREE POINT	AT	x_inter,y_inter,x_end,y_end [,chord_angle];
PLOT ABSOLUTE	PA	[x,y ... [,x,y]];
PLOT RELATIVE	PR	[x,y ... [,x,y]];
PEN DOWN	PD	[x,y ... [,x,y]];
PEN UP	PU	[x,y ... [,x,y]];
RELATIVE ARC THREE POINT	RT	x_incr_inter,y_incr_inter,x_incr_end,y_incr_end [,chord_angle];
POLYLINE ENCODED	PE	[flag[val]]coord_pair ... [flag[val]]coord_pair];

HP-GL/2 Kernel (continued)

COMMAND	MNEMONIC	PARAMETERS*
POLYGON GROUP *Parameters in brackets are optional.		
CIRCLE	CI	radius [,chord_angle];
FILL RECTANGLE ABSOLUTE	RA	x_coordinate,y_coordinate;
FILL RECTANGLE RELATIVE	RR	x_increment,y_increment;
EDGE RECTANGLE ABSOLUTE	EA	x_coordinate,y_coordinate;
EDGE RECTANGLE RELATIVE	ER	x_increment,y_increment;
FILL WEDGE	WG	radius,start_angle,sweep_angle [,chord_angle];
EDGE WEDGE	EW	radius,start_angle,sweep_angle [,chord_angle];
POLYGON MODE	PM	polygon_definition;
FILL POLYGON	FP	
EDGE POLYGON	EP	

HP-GL/2 Kernel (continued)

COMMAND	MNEMONIC	PARAMETERS*
CHARACTER GROUP *Parameters in brackets are optional.		
SELECT STANDARD FONT	SS	
SELECT ALTERNATE FONT	SA	
ABSOLUTE DIRECTION	DI	[run, rise];
RELATIVE DIRECTION	DR	[run, rise];
ABSOLUTE CHARACTER SIZE	SI	[width, height];
RELATIVE CHARACTER SIZE	SR	[width, height];
CHARACTER SLANT	SL	[tangent_of_angle];
EXTRA SPACE	ES	[width [, height]]
STANDARD FONT DEFINITION	SD	[kind, value ... [, kind, value]];
ALTERNATE FONT DEFINITION	AD	[kind, value ... [, kind, value]];
CHARACTER FILL MODE	CF	[fill_mode[, edge_pen]];
LABEL ORIGIN	LO	[position];
LABEL	LB	[char ... [char]] 1bterm
DEFINE LABEL TERMINATOR	DT	[1bterm[, mode]];
CHARACTER PLOT	CP	[spaces, lines];
TRANSPARENT DATA	TD	[mode];
DEFINE VARIABLE TEXT PATH	DV	[path[, line]];

HP-GL/2 Kernel (continued)

COMMAND	MNEMONIC	PARAMETERS*
LINE AND FILL ATTRIBUTES GROUP		
*Parameters in brackets are optional.		
LINE TYPE	LT	[line_type[, pattern_length[, mode]]];
LINE ATTRIBUTES	LA	[kind, value ... [, kind, value]];
PEN WIDTH	PW	[width[, pen]];
PEN WIDTH UNIT SELECTION	WU	[type];
SELECT PEN	SP	[pen];
SYMBOL MODE	SM	[char];
FILL TYPE	FT	[fill_type[, option1[, option2]]];
ANCHOR CORNER	AC	[x_coordinate, y_coordinate];
RASTER FILL DEFINITION	RF	[index[, width, height, pen_nbr ... pen_nbr]];
USER DEFINED LINE TYPE	UL	[index[, gap1 ... gapn]];
CONFIGURATION AND STATUS GROUP		
*Parameters in brackets are optional.		
SCALE	SC	[x1, x2, y1, y2[, type[, left, bottom]]]; or [x1, xfactor, y1, yfactor, 2];
INPUT WINDOW	IW	[xLL, yLL, xUR, yUR];
INPUT P1 AND P2	IP	[p1x, p1y[, p2x, p2y]];
INPUT RELATIVE P1 AND P2	IR	[p1x, p1y[, p2x, p2y]];
DEFAULT VALUES	DF	
INITIALIZE	IN	[n];
ROTATE COORDINATE SYSTEM	RO	[angle];
ADVANCE FULL PAGE	PG	[n];
REPLOT	RP	[n];

CONTROL CODES

Backspace	B_S	Move one column left unless at left margin in which case no action is taken.
Line Feed	L_F	Move to next print line while maintaining current column position.
Form Feed	F_F	Move to first line at top of the next page while maintaining current column position.
Carriage Return	C_R	Move to the left margin on current print line.
Shift Out	S_O	Select characters that follow from the current secondary font until receipt of a Shift In.
Shift In	S_I	Select characters that follow from the current primary font until receipt of a Shift Out.
Escape	E_C	Indicates the beginning of a special control sequence (escape sequence).
Horizontal Tab	H_T	Move to next horizontal tab stop. The tab stops are at the left margin and at every eight columns to the right of the left margin.
Space	S_P	Move one column to the right unless at right margin in which case no action is taken.

ROMAN-8 CHARACTER CONVERSION TABLE

Graphic	Hex	Dec	Oct	Description
	00	0	000	NUL (null)
	01	1	001	SOH (start of heading)
	02	2	002	STX (start of text)
	03	3	003	ETX (end of text)
	04	4	004	EOT (end of transmission)
	05	5	005	ENQ (enquiry)
	06	6	006	ACK (acknowledge)
	07	7	007	BEL (bell)
	08	8	010	BS (backspace)
	09	9	011	HT (horizontal tabulation)
	0A	10	012	LF (line feed)
	0B	11	013	VT (vertical tabulation)
	0C	12	014	FF (form feed)
	0D	13	015	CR (carriage return)
	0E	14	016	SO (shift out)
	0F	15	017	SI (shift in)
	10	16	020	DLE (data link escape)
	11	17	021	DC1 (device control 1 or X-ON)
	12	18	022	DC2 (device control 2)
	13	19	023	DC3 (device control 3 or X-OFF)
	14	20	024	DC4 (device control 4)
	15	21	025	NAK (negative acknowledge)
	16	22	026	SYN (synchronous idle)
	17	23	027	ETB (end of transmission block)
	18	24	030	CAN (cancel)
	19	25	031	EM (end of medium)
	1A	26	032	SUB (substitute)
	1B	27	033	ESC (escape)
	1C	28	034	FS (file separator)
	1D	29	035	GS (group separator)
	1E	30	036	RS (record separator)
	1F	31	037	US (unit separator)
	20	32	040	SP (space)
!	21	33	041	Exclamation point
"	22	34	042	Quotation mark
#	23	35	043	Number sign
\$	24	36	044	Dollar sign
%	25	37	045	Percent sign
&	26	38	046	Ampersand
'	27	39	047	Closing single quote (apostrophe)

Graphic	Hex	Dec	Oct	Description
(28	40	050	Opening parenthesis
)	29	41	051	Closing parenthesis
*	2A	42	052	Asterisk
+	2B	43	053	Plus
,	2C	44	054	Comma
-	2D	45	055	Hyphen
.	2E	46	056	Period (point)
/	2F	47	057	Slant (solidus)
0	30	48	060	Zero
1	31	49	061	One
2	32	50	062	Two
3	33	51	063	Three
4	34	52	064	Four
5	35	53	065	Five
6	36	54	066	Six
7	37	55	067	Seven
8	38	56	070	Eight
9	39	57	071	Nine
:	3A	58	072	Colon
;	3B	59	073	Semicolon
<	3C	60	074	Less than sign
=	3D	61	075	Equals sign
>	3E	62	076	Greater than sign
?	3F	63	077	Question mark
@	40	64	100	Commercial At
A	41	65	101	Uppercase A
B	42	66	102	Uppercase B
C	43	67	103	Uppercase C
D	44	68	104	Uppercase D
E	45	69	105	Uppercase E
F	46	70	106	Uppercase F
G	47	71	107	Uppercase G
H	48	72	110	Uppercase H
I	49	73	111	Uppercase I
J	4A	74	112	Uppercase J
K	4B	75	113	Uppercase K
L	4C	76	114	Uppercase L
M	4D	77	115	Uppercase M
N	4E	78	116	Uppercase N
O	4F	79	117	Uppercase O

Graphic	Hex	Dec	Oct	Description
P	50	80	120	Uppercase P
Q	51	81	121	Uppercase Q
R	52	82	122	Uppercase R
S	53	83	123	Uppercase S
T	54	84	124	Uppercase T
U	55	85	125	Uppercase U
V	56	86	126	Uppercase V
W	57	87	127	Uppercase W
X	58	88	130	Uppercase X
Y	59	89	131	Uppercase Y
Z	5A	90	132	Uppercase Z
[5B	91	133	Opening square bracket
\	5C	92	134	Reverse slant
]	5D	93	135	Closing bracket
^	5E	94	136	Caret (circumflex)
_	5F	95	137	Underscore (low line)
'	60	96	140	Opening Single Quote
a	61	97	141	Lowercase a
b	62	98	142	Lowercase b
c	63	99	143	Lowercase c
d	64	100	144	Lowercase d
e	65	101	145	Lowercase e
f	66	102	146	Lowercase f
g	67	103	147	Lowercase g
h	68	104	150	Lowercase h
i	69	105	151	Lowercase i
j	6A	106	152	Lowercase j
k	6B	107	153	Lowercase k
l	6C	108	154	Lowercase l
m	6D	109	155	Lowercase m
n	6E	110	156	Lowercase n
o	6F	111	157	Lowercase o
p	70	112	160	Lowercase p
q	71	113	161	Lowercase q
r	72	114	162	Lowercase r
s	73	115	163	Lowercase s
t	74	116	164	Lowercase t
u	75	117	165	Lowercase u
v	76	118	166	Lowercase v
w	77	119	167	Lowercase w

Graphic	Hex	Dec	Oct	Description
x	78	120	170	Lowercase x
y	79	121	171	Lowercase y
z	7A	122	172	Lowercase z
{	7B	123	173	Opening brace (curly bracket)
	7C	124	174	Vertical line
}	7D	125	175	Closing brace (curly bracket)
~	7E	126	176	Approximate (tilde)
⌘	7F	127	177	DEL (delete, rubout)
	80	128	200	--undefined control code--
	81	129	201	--undefined control code--
	82	130	202	--undefined control code--
	83	131	203	--undefined control code--
	84	132	204	--undefined control code--
	85	133	205	--undefined control code--
	86	134	206	--undefined control code--
	87	135	207	--undefined control code--
	88	136	210	--undefined control code--
	89	137	211	--undefined control code--
	8A	138	212	--undefined control code--
	8B	139	213	--undefined control code--
	8C	140	214	--undefined control code--
	8D	141	215	--undefined control code--
	8E	142	216	--undefined control code--
	8F	143	217	--undefined control code--
	90	144	220	--undefined control code--
	91	145	221	--undefined control code--
	92	146	222	--undefined control code--
	93	147	223	--undefined control code--
	94	148	224	--undefined control code--
	95	149	225	--undefined control code--
	96	150	226	--undefined control code--
	97	151	227	--undefined control code--
	98	152	230	--undefined control code--
	99	153	231	--undefined control code--
	9A	154	232	--undefined control code--
	9B	155	233	--undefined control code--
	9C	156	234	--undefined control code--
	9D	157	235	--undefined control code--
	9E	158	236	--undefined control code--
	9F	159	237	--undefined control code--

Graphic	Hex	Dec	Oct	Description
À	A0	160	240	--undefined--
Á	A1	161	241	Uppercase A grave
Â	A2	162	242	Uppercase A circumflex
Ã	A3	163	243	Uppercase E grave
Ä	A4	164	244	Uppercase E circumflex
Å	A5	165	245	Uppercase E dieresis
İ	A6	166	246	Uppercase I circumflex
Î	A7	167	247	Uppercase I dieresis
·	A8	168	250	Lowercase acute accent
˘	A9	169	251	Lowercase grave accent
ˆ	AA	170	252	Lowercase circumflex accent
¨	AB	171	253	Lowercase dieresis accent
˜	AC	172	254	Lowercase tilde accent
Ù	AD	173	255	Uppercase U grave
Ú	AE	174	256	Uppercase U circumflex
£	AF	175	257	Italian lira (pound sterling)
—	B0	176	260	Overscore (high line)
Ý	B1	177	261	Uppercase Y acute
ý	B2	178	262	Lowercase y acute
°	B3	179	263	Degree
Ç	B4	180	264	Uppercase C cedilla
ç	B5	181	265	Lowercase c cedilla
Ñ	B6	182	266	Uppercase N tilde
ñ	B7	183	267	Lowercase n tilde
¡	B8	184	270	Inverted exclamation mark
¿	B9	185	271	Inverted question mark
¤	BA	186	272	General currency symbol
£	BB	187	273	Pound sterling sign
¥	BC	188	274	Yen sign
§	BD	189	275	Section mark
ƒ	BE	190	276	Dutch guilder symbol
¢	BF	191	277	Cent sign
â	C0	192	300	Lowercase a circumflex
ê	C1	193	301	Lowercase e circumflex
ô	C2	194	302	Lowercase o circumflex
û	C3	195	303	Lowercase u circumflex
á	C4	196	304	Lowercase a acute
é	C5	197	305	Lowercase e acute
ó	C6	198	306	Lowercase o acute
ú	C7	199	307	Lowercase u acute

Graphic	Hex	Dec	Oct	Description
à	C8	200	310	Lowercase a grave
è	C9	201	311	Lowercase e grave
ò	CA	202	312	Lowercase o grave
ù	CB	203	313	Lowercase u grave
ä	CC	204	314	Lowercase a dieresis
ë	CD	205	315	Lowercase e dieresis
ö	CE	206	316	Lowercase o dieresis
ü	CF	207	317	Lowercase u dieresis
À	D0	208	320	Uppercase A bolle
î	D1	209	321	Lowercase i circumflex
Ø	D2	210	322	Uppercase O oblique
Æ	D3	211	323	Uppercase AE diphthong
å	D4	212	324	Lowercase a bolle
í	D5	213	325	Lowercase i acute
ø	D6	214	326	Lowercase o oblique
æ	D7	215	327	Lowercase ae diphthong
Ä	D8	216	330	Uppercase A dieresis
ì	D9	217	331	Lowercase i grave
Ö	DA	218	332	Uppercase O dieresis
Ü	DB	219	333	Uppercase U dieresis
É	DC	220	334	Uppercase E acute
ï	DD	221	335	Lowercase i dieresis
ß	DE	222	336	Lowercase es-zet ligature
Ö	DF	223	337	Uppercase O circumflex
Á	E0	224	340	Uppercase A acute
Â	E1	225	341	Uppercase A tilde
ã	E2	226	342	Lowercase a tilde
Ð	E3	227	343	Uppercase Eth
ð	E4	228	344	Lowercase eth Icelandic
Í	E5	229	345	Uppercase I acute
Ì	E6	230	346	Uppercase I grave
Ó	E7	231	347	Uppercase O acute
Ò	E8	232	350	Uppercase O grave
Õ	E9	233	351	Uppercase O tilde
õ	EA	234	352	Lowercase o tilde
Š	EB	235	353	Uppercase S hacek
š	EC	236	354	Lowercase s hacek
Ú	ED	237	355	Uppercase U acute
Ÿ	EE	238	356	Uppercase Y dieresis
ÿ	EF	239	357	Lowercase y dieresis

Graphic	Hex	Dec	Oct	Description
Þ	F0	240	360	Uppercase Thorn
þ	F1	241	361	Lowercase thorn
·	F2	242	362	Lowercase Catalan middle dot
μ	F3	243	363	Lowercase mu (micro)
¶	F4	244	364	Pilcrow (paragraph sign)
¾	F5	245	365	Vulgar fraction: three fourths
—	F6	246	366	Minus sign
¼	F7	247	367	Vulgar fraction: one fourth
½	F8	248	370	Vulgar fraction: one half
ª	F9	249	371	Female ordinal
º	FA	250	372	Male ordinal
«	FB	251	373	Left pointing guillemets (quotes)
■	FC	252	374	Medium solid box
»	FD	253	375	Right pointing guillemets (quotes)
±	FE	254	376	Plus over minus
	FF	255	377	--undefined--

HP 33449 DISPLAY LANGUAGE MESSAGE TRANSLATIONS

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Localized Display Message Tables

The following tables contain localized text translations for HP 33449 printer Control Panel display messages. HP 33440 display messages are not localized.

Display Language Messages

English	French	German	Italian	Spanish
LANGUAGE=ENG	LANGUE=FR	SPRACHE=DEU	LINGUA=ITA	LENGUAJE=ESP

Printing Menu Messages

English	French	German	Italian	Spanish
COPIES=	COPIES=	EXEMPLARE=	NUM. COPIE=	COPIAS=
FONT SOURCE= [I,L,R,S]	TYPE POL= [I,G,D,TEL]	SCHRIFTQUELLE= [E,L,R,S]	SERIE CARATT= [I,S,D,SF]	FONT FUENTE= [I,Z,D,S]
FONT NUMBER=	N° POLICE=	S.NUMMER=	N.CARATTERE=	NUM.DE FONT=
PITCH=	ESPACEMNT=	Z.-DICHT=	PASSO=	PITCH=
PT. SIZE=	CORPS=	GROESSE=	CORPO=	TamañoPto=
PAPER= [LETTER,LEGAL, EXEC,A4]	FORMAT= [LETTER,LEGAL, EXEC,A4]	FORMAT= [LETTER,LEGAL, EXEC,A4]	FORMATO= [LETTERA,LEGALE, EXEC,A4]	PAPEL= [LETTER,LEGAL, EXEC,A4]
ENVELOPE= [COM10,MONARC, DL,C5]	ENVELOP= [COM10,MONARC, DL,C5]	UMSCHLAG= [COM10,MONARC, DL,C5]	BUSTA= [COM10,MONARC, DL,C5]	SOBRE= [COM10,MONARC, DL,C5]
ORIENTATION=[F,L]	ORIENTATION=[F,I]	AUSRICHTUNG=[H,Q]	ORIENTAMENTO=[V,O]	ORIENTACION=[V,O]
FORM=nnn LINES	NB LIGNES=	S.LAENGE=	RIGHE PAG.=	FORMATO=
MANUAL FEED= [ON,OFF]	ALIM MANUELLE= [O,N]	MAN. ZUFUHR= [EIN,AUS]	ALIMENT MAN= [ON,OFF]	ALIM.MANUAL= [ON,OFF]
SYM SET= ...,GERMAN,SPANISH,...	SYMBOL= ...,GERMAN,SPANISH,...	Z.SATZ= ...,GERMAN,SPANISH,...	SIMBOLI= ...,GERMAN,SPANISH,...	JGO.CAR= ...,ALEMAN,Español,...

Configuration Menu Messages

	French	German	Italian	Spanish
CONT= [OFF]	REPRISE AUTO= [O,N]	AUTO WEITER= [EIN,AUS]	CONT AUTOM= [ON,OFF]	AUTO CONT= [ON,OFF]
SERIAL, [SERIELE,OPTIONAL]	INTF= [RIEN,SERIE, PARALLELE,OPTION]	E/A= [KEINE,SERIELL, PARALLEL,OPTIONAL]	I/O= [NESSUNA,SERIALE, PARALLELA,OPZIONALE]	E/S= [NINGUNO,SERIE, PARALELO,OPCIONAL]
L= [RS-422]	SERIE=	SERIELL=	SERIALE=	SERIE=
RATE= [0,1200,2400,4800, 9200]	VITESSE=	BAUDRATE=	VEL TRASM=	VELOCIDAD=
ST XON= [OFF]	ROBUST XON= [O,N]	ROBUST XON= [EIN,AUS]	ROBUST XON= [ON,OFF]	ROBUST XON= [ON,OFF]
POLARITY= [H]	POLARITE DTR= [H,B]	DTR-POLARITY= [H,N]	POLAR DTR= [ALTA,BASSA]	POLARID DTR= [ALT,BAJ]
MEDIUM, [OFF]	RET= [SOMBRE,MOYEN, CLAIR,NON]	RET= [DUNKEL,NORMAL, HELL,AUS]	RET= [SCURO,NORMALE, CHIARO,OFF]	RET= [OSCURO,MEDIO, CLARO,DESACTIVADO]
PROTECT= [LTR,LGL,A4]	RESERV MEM= [NON,LTR,LGL,A4]	KOMPLEX= [AUS,LTR,LGL,A4]	PROTEZ PAG= [OFF,LTR,LGL,A4]	PROTEC.PAG.= [OFF,LTR,LGL,A4]

Status Messages

	French	German	Italian	Spanish
READY	00 PRET	00 BEREIT	00 PRONTA	00 PREPARADO
WARMING UP	02 PRECHAUFFE	02 BITTE WARTEN	02 ATTENDERE	02 ESPERAR
OFF TEST	04 AUTO-TEST	04 SELBSTTEST	04 AUTO TEST	04 AUTO TEST
OFF TEST	05 AUTO-TEST	05 SELBSTTEST	05 AUTO TEST	05 AUTO TEST
PRINTING TEST	06 IMPR TEST	06 DRUCKTEST	06 STAMPA TEST	06 TEST IMPRES.
PRINTOUT	06 IMPRIME POL	06 SCHRIFTLISTE	06 STAMPA CARATT	06 LISTADO FONTS
RESET	07 REINIT	07 ZURUECKSETZEN	07 RESET	07 INICIALIZAR
MENU RESET	09 REINIT MENU	09 AUSGANGSWERTE	09 RESET MENU	09 MENU INICIAL
ENGINE TEST	15 TEST MOTEUR	15 MOTORTTEST	15 TEST MACCHINA	15 TEST MAQUINA
MEMORY CONFIG	17 CONFIG MEM	17 SPEICHERKONFG	17 CONFIG.MEMOR.	17 CONFIG.MEMOR.

Attendance Messages

English	French	German	Italian	Spanish
10 RESET TO SAVE	10 REINIT CONFIG	10 ZUR.Z.SICHERN	10 RESET=Salva	10 RESET, GUARDA
12 PRINTER OPEN	12 CAPOT OUVERT	12 GERAET OFFEN	12 STAMP. APERTA	12 IMPR. ABIERTA
13 PAPER JAM	13 BOURRAGE	13 PAPIERSTAU	13 CARTA INCEPP.	13 ATASCO PAPEL
14 NO EP CART	14 CART ENCRE !	14 KEINE TONER-K	14 MANCA CART EP	14 CART.NO INST.
16 TONER LOW	16 MANQUE ENCRE	16 TONER FEHLT	16 MANCA TONER	16 TONER BAJO
FE CARTRIDGE	PE ATTN POL CART	SK ENTFERNT	ER CARTUCCIA	EF CARTUCHO
FC LEFT	PC GAUCHE	SK LINKS ENTF.	CC SINISTRA	CF IZQUIERDO
FC RIGHT	PC DROITE	SK RECHTS ENTF.	CC DESTRA	CF DERECHO
FC BOTH	PC G/D	SK BEIDE ENTF.	CC S+D	CF AMBOS
FC LEFT NO FONT	PC GAUCHE ERR	SK LINK FEHLER	CC SIN. NO FONT	CF IZQDO NO FON
FC RIGHT NO FONT	PC DROITE ERR	SK RECHTS FEHLER	CC DESTR NO FONT	CF DRCHO NO FON
FC BOTH NO FONT	PC G/D ERR	SK BEIDE FEHLER	CC S+D NO FONT	CF AMBOS NO FON
PF FEED [paper]	PM ALIM [paper]	PK M.ZUF. [paper]	AC MAN. [paper]	AM PAPEL [paper]
PE FEED [envelope]	EM ALIM [envelope]	BK M.ZUF. [envelope]	AB MAN. [envelope]	AM SOBRE [envelop]
PC LOAD [paper]	CP CHRg [paper]	PK LADEN [paper]	CA CARIC [paper]	CP CARGA [paper]
EC LOAD [envelope]	CE CHRg [envelope]	BK LADEN [envelope]	VB CARICA [envelope]	AS CARGA [envelop]
PE TRAY=[envelope]	AE BAC=[envelope]	BU KASS=[envelope]	VB PRONTO=[envelope]	SP BANDJ=[envelop]

Error and Service Messages

English	French	German	Italian	Spanish
20 MEM OVERFLOW	20 MEM SATURÉE	20 SPEICHER VOLL	20 SUPERAM. MEM.	20 DESBORD MEM
21 PRINT OVERRUN	21 PAGE TP DENSE	21 ZUVIELE DATEN	21 TROPPI DATI	21 DESBORD PAG.
22 I/O CNFIG ERR	22 ERR CONF INTF	22 E/A-KONFG-F.	22 ERR CONF I/O	22 ERR CONF E/S
42 OPT INTERFACE	42 INTERFACE OPT	42 OPT INTERFACE	42 INTERFAC. OPZ	42 INTERFASE OPC
43 OPT INTERFACE	43 INTERFACE OPT	43 OPT INTERFACE	43 INTERFAC. OPZ	43 INTERFASE OPC
ERROR	ERREUR	FEHLER	ERRORE	ERROR
SERVICE	MATERIEL	WARTUNG	INTERVENIRE	SERVICIO
68 READY/SERVICE	68 PRET/MATERIEL	68 BEREIT/WARTNG	68 PRONTA/INTERV	68 PREPDO/SERVIC

Glossary

Application

A software program or group of programs, for example, Wordstar and Lotus 1-2-3, for solving common business tasks.

Assembly

A collection of printer components assembled into a single replaceable unit.

Attendance Message

A Control Panel display message asking that the user perform a requested task, such as loading paper, before printing continues.

Baud Rate

The data transfer rate between the computer and the printer. The computer and the printer must be configured at the same baud rate. It can be set between 300 and 19,200 baud, depending upon the type of computer used.

Bitmapped Font

A particular collection of symbols with fixed character size and shape.

Beam Detect Mirror

Reflects the beginning of each laser beam print line into the Fiber Optics Cable. The DC Controller PCA receives the reflected laser beam and translates it into a Beam Detect signal.

Cold Reset

Used to return the user default settings for both the Printing and I/O Configuration Menus back to the initial factory settings.

Component

A single part of the printer that does not have any attached parts.

Configuration

The process of specifying certain settings to allow the computer and printer to communicate properly. For example, interface selection (serial or parallel) is part of printer configuration. The printer is configured through the Control Panel. An "MS-DOS" computer is configured through MODE commands in the AUTOEXEC.BAT file.

Configuration Menu

One of two Control Panel menus accessed using the **MENU** key. The Configuration Menu contains printer configuration settings such as communication parameters, Resolution Enhancement levels, and memory configuration.

Control Panel

The main printer access and display panel used to modify the printer's printing and configuration information as well as to display printer status. Usually, the computer's software application can send signals to modify the printer's printing information (lines-per-page, font type used, page orientation, etc.). Refer to Chapter 3, Section 3-2, "Unpacking and Installation," for more information.

Cotton Bond

A type of paper which includes a percentage of cotton fibers. It is usually used when a "high-quality" paper is desired.

DC Controller PCA

Synchronizes all printer operations by monitoring and supplying voltages to all electro-mechanical assemblies inside the printer.

Default

A printer setting used in the absence of a software application selection.

Dots-per-inch (DPI)

The number of horizontal and vertical dots produced by a printer inside the area of a square inch. The HP 33440 and HP 33449 printers are capable of producing a vertical dot every 1/300th of an inch and a horizontal dot every 1/300 of an inch.

Downloading

Refers to the process of transferring fonts or macros stored on disks to the printer's memory. These transferred fonts and macros are stored in the printer until it is turned off or they are removed by a software printer command.

Dual I/O Interface

The HP 33440 and HP 33449 printers come with two interface ports, serial and parallel. The serial port can be configured as either RS-232 or RS-422. (See Chapter 3, Section 3-2, "Unpacking and Installation.")

Electrostatic Discharge (ESD)

Electrical charges generated by friction that are displaced to another object. Electronic components can be permanently damaged by Electrostatic Discharge.

Embedded Printer Commands

Printer commands written by the user directly into a software file.

Escape Sequences

Software commands to the printer. The printer distinguishes these commands from regular text by the presence of an E_C , a special control code which precedes the character string.

EP-S Cartridge

Contains items such as the cleaning blade, primary corona, photosensitive drum, and a supply of toner. Because the drum is photosensitive, it must be protected from exposure to light. The replaceable cartridge prints an average of 4,000 pages.

Error Message

A Control Panel display message that informs the user when the printer stops due to a data or print error.

Face-Up Tray

A tray, which can be opened at the rear of the printer, which supports printed pages stacked in face-up, reverse order.

Factory Default Settings

The Control Panel menu settings that are programmed into the printer at the factory. These settings are used as defaults unless they are changed by user Control Panel selections or overridden by print commands sent through a software application.

Flowchart

A diagram used to provide detailed sequential direction through a linear process. In Chapter 7, troubleshooting flowcharts are used to direct the service representative through a series of detailed problem solving processes.

Font

Fonts are collections of characters and symbols derived from a specific typeface. A font is described by its symbol set, spacing, pitch, point size, style, stroke weight, and typeface. Fonts can refer to the printer's internal fonts or to fonts stored in optional font cartridges or on floppy disks.

Font Cartridge

A plug-in device containing additional fonts. Font cartridges contain fonts which can supplement the printer's internal resident fonts to increase the variety of available typefaces.

Font Printout

A Font Printout is used to verify all fonts available in the printer (see Chapter 3, Section 3-5).

Front Panel

Referred to in previous documents as the printer's "front," "display," or "pushbutton" panel, it is now referred to as the Control Panel. (The "front cover panel" or simply "front panel" is the front portion of the Main Body Covers.)

Internal Fonts

The fonts resident in the printer when shipped from the factory.

Keys

The HP 33440 and HP 33449 printers have eight Control Panel keys used to access specific functions of the printer (see Chapter 3).

Laser Beam

Amplified light waves that are concentrated by the Laser PCA to produce an intense beam of light which writes on the EP drum to produce an image.

Laser Printing Process

The stages of the Laser Printing Process which must each function independently and be coordinated with all other printer processes to form an image (see Chapter 5, Section 5-2, "Image Formation System").

Menu

Menus list items that can be selected from the printer's Control Panel. The printer has two menus: the Printing Menu and the Configuration Menu. The Printing Menu lets the user select printing defaults such as the number of copies to print and the default font. The

Configuration Menu lets the user select configuration items, such as parallel or serial I/O configuration.

Off Line

When the printer is *off line*, it will not accept data from the computer. The printer is taken *off line* by pressing the **ON LINE** key. When the ON LINE indicator is off, the printer is *off line*.

On Line

When the printer is *on line*, it will accept data from the computer. The printer is *on line* when the ON LINE indicator is on.

Orientation

Orientation refers to the direction of print on the page. Printing across the narrower dimension of a page is called portrait orientation printing. The word *portrait* is derived from portraits of people which are usually vertical in format. Printing across the wider dimension of a page is called landscape orientation printing. The term *landscape* is derived from pictures of the landscape which are usually horizontal in format.

Output Tray

Two output trays are available with the HP 33440 and HP 33449 printers: the Face-Up (Rear) Output Tray and the Face-Down (Top) Output Tray.

Page Count

The HP 33440 and HP 33449 printers keep a record of the number of pages they print. This record is called the Page Count. Each time the printer is turned off, the Page Count is rounded down to the closest increment of ten. To alter the Page Count, the technician must be in the Service Mode. Page Count is displayed as part of the Self-Test Printout.

Page Protection

Reserving a block of printer memory to prevent 21 PRINT OVERRUN errors when composing very dense or complex graphics and text (see Chapter 3, Section 3-4, "Using the Printing and Configuration Menus").

Paper Jam

A paper jam describes what happens when paper gets stuck somewhere inside the printer's paper path. Paper jams can be caused by toner buildup in the Fusing Assembly, faulty photosensors, worn printer parts, or poor or improperly handled media (see Chapter 4, Section 4-5, "Clearing Paper Jams").

Paper Path

The route the paper takes during the printing process. It begins at the paper pick-up area and ends when the paper exits the printer at the paper output tray.

Permanent Soft Fonts

Soft fonts downloaded into the printer's memory that remain resident there, even if the printer is reset, until the printer is powered off or the fonts are deleted by software printer commands. (Resetting the printer does *not* clear a permanent font from memory.) (See *downloading*.)

Photosensitive Drum

The Photosensitive Drum in the *EP-S Cartridge* is sensitive to both light and electrical voltages. It is used in the creation and transfer of images to the printed page.

Photosensor

A sensor that is activated when its field of vision is blocked. These sensors are used to detect the presence of paper inside the printer.

Pitch

The number of characters printed per horizontal inch. Pitch applies only to fonts with *fixed spacing*.

Point Size

The height of a font. Point size is measured from slightly above the top of uppercase letters to slightly below the bottom of lowercase descenders, such as the tail of the letter “y.” There are 72 points per inch.

Primary Corona

The Primary Corona, located inside the EP-S Cartridge, is used to neutralize the photosensitive drum’s surface charge and place a uniform charge back onto the drum. Refer to Chapter 5, Section 5-2, “Image Formation System.”

Print Density

Print density refers to the relative darkness of print on the page. Very dense print appears totally black. Less dense print looks lighter and may have solid filled areas that are not totally covered. The print density can be adjusted in LaserJet printers (see Chapter 4, Section 4-9, “Print Density Adjustment”).

Print Period

The print period begins when the DC Controller PCA receives a $\overline{\text{VDO}}$ signal from the Interface/Formatter PCA and ends when the last line of print data is transmitted.

Print Quality

Print quality refers to the sharpness and clarity of the type or graphic on the printed page.

Printing Menu

One of two menus accessed from the printer Control Panel by pressing the **MENU** key. Several printing items like the number of copies to print and the number of lines per page are selected from this menu.

Proportional Spacing

The horizontal spacing between characters based upon the character’s relative width, rather than a fixed cell size. The width of each character cell varies.

Resolution Enhancement (RET) (HP 33449 only)

An HP 33449-only feature that improves the 300 dpi print quality standard (see Chapter 3, Section 3-4, “Using the Printing and Configuration Menus”).

Robust-Xon

Robust-Xon is a transmission protocol used in serial communications. When Robust-Xon is ON, the printer sends continuous ready messages to the computer, one per second. When Robust-Xon is OFF, the printer sends only one ready message. Robust-Xon is recommended.

Rotating Scanner Mirror

This mirror, part of the Laser/Scanning Assembly, is used to scribe and reflect the laser beam onto the photosensitive drum.

Scalable Type

Scalable type refers to characters (generated from a specific typeface) that can be scaled to virtually any desirable size or pitch. This provides significantly expanded font capabilities with only a few typefaces (from which the font shapes are generated). This feature is built into the HP 33449.

Self Test

Used to verify proper printer operation (see Chapter 3, Section 3-6, "Self Tests").

Service Message

This is a Control Panel display message that informs the user when a printer part fails to perform correctly.

Service Mode

While in Service Mode, the user can print a Chart A printout, Service Mode Self Test printout, and change the Page Count (see Chapter 3, Section 3-7, "Service Mode").

Set-Up Strings

Embedded commands, usually for initializing the printer, that precede any other print data.

Soft Font

Soft fonts are fonts created or stored on disks. They can be transferred to the printer's memory where they remain available to be used until the printer is turned off.

Solenoid

An electrically directed mechanism used to control the movement of gears inside the printer.

Spacing

The distance between individual printed characters. All fonts have either *fixed* or *proportional* spacing.

Standby Period

This is the period of time just after power up, after the self test has executed and the Fusing Assembly has reached its operating temperature. The printer is READY but has not received the first print command (PRNT) from the Interface/Formatter PCA. Note that this is characteristic of a READY printer with no Main or Scanner Motor operating.

Status Message

Control Panel display messages that keep the user informed of the printer's current operating status.

Stroke Weight

The thickness of a printed font: for example, light, medium, and bold.

Style

The slant of a font: for example, *upright* (normal text) or *italic* (slanted text).

Symbol Set

A unique grouping of all the available characters in a font. Each symbol set is defined with a specific set of applications in mind. For example, the LEGAL symbol set includes special characters used in the law profession.

Temporary Font

A font that resides in printer's memory until the user prints a font list, resets the printer, powers the printer off, or clears or replaces it using a software command. Temporary fonts are not listed on the font printout because they are erased when the font list is generated.

Test Print

Used to verify proper operation of the print engine controlled by the DC Controller PCA (see Chapter 3, Section 3-6).

Toner

Toner is a dry mixture of powdered "ink" capable of being electrically charged and attracted to discharged areas on the revolving photosensitive drum in the EP-S Cartridge (see Chapter 5, Section 5-2, "Image Formation System").

Treatment

Treatment is the emphasis placed on a font, such as italic or bold. Treatment describes both style and stroke weights.

Typeface

The design aspect of fonts from which symbol sets are created (see *scalable type*).

User Default Settings

User Default Settings are Printing Menu choices the user has selected through the Control Panel. They are set using the *Printing Menu* (see Chapter 3, Section 3-3. "Using the Control Panel").

Warm-up Period

The warm-up period covers the time from switching the printer's power ON until the fusing temperature reaches 165° C.

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